The Mining Journal

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Vol. CCXLI No. 6174 — LONDON, DECEMBER 18, 1953 — PRICE 8d

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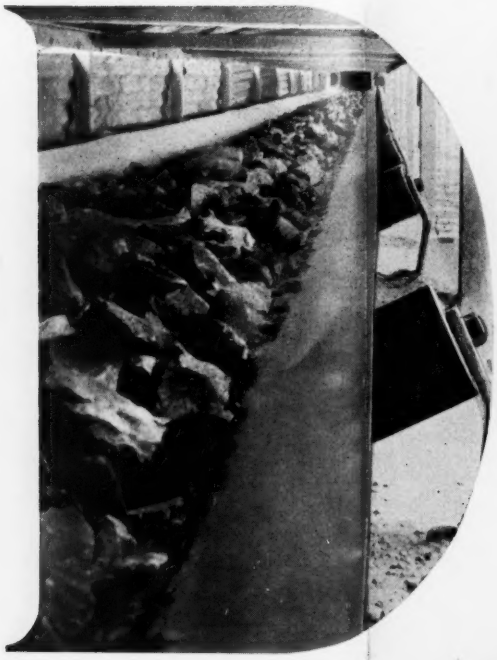

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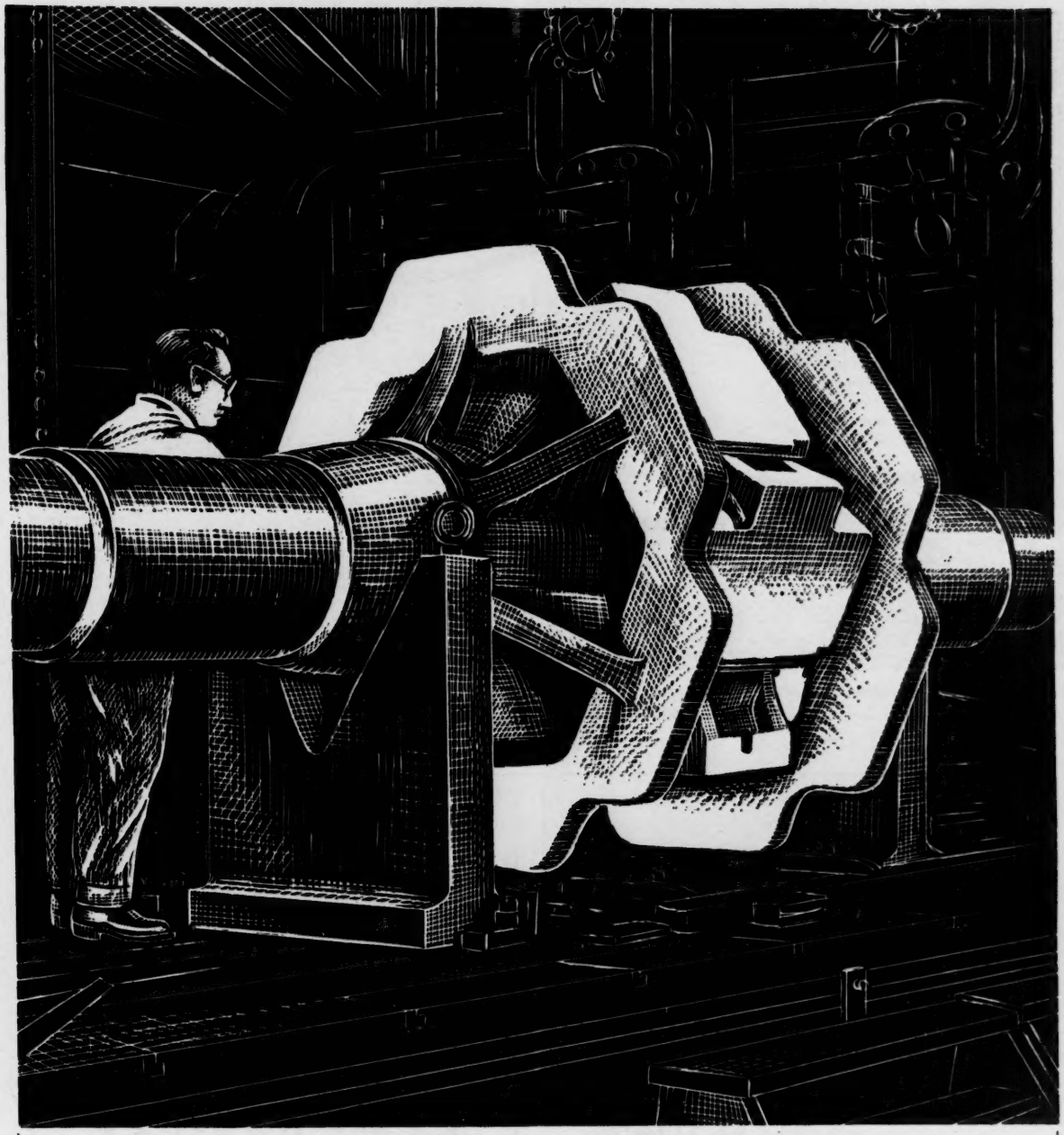

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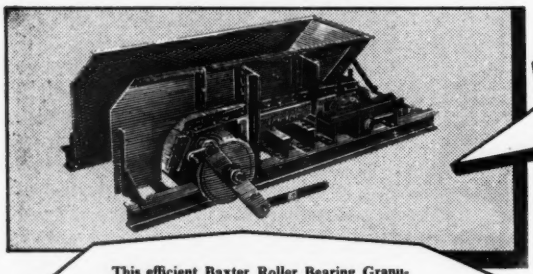

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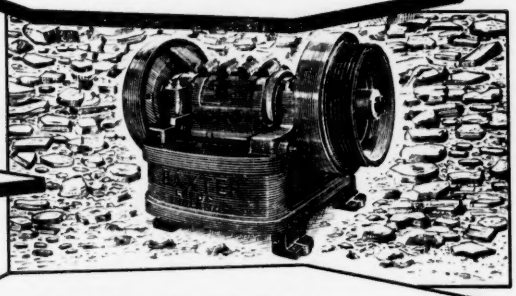

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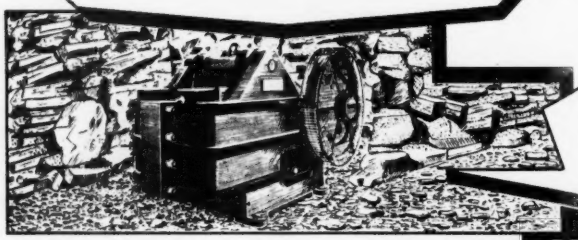

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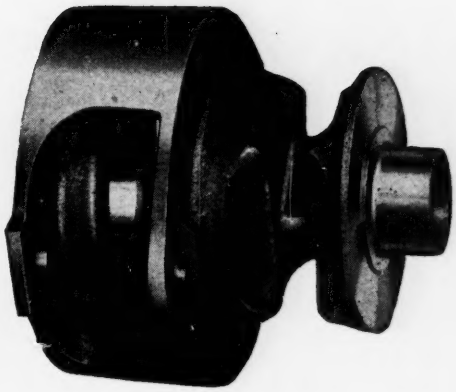

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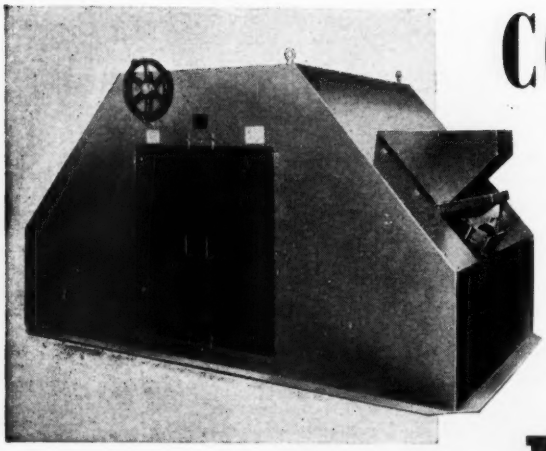

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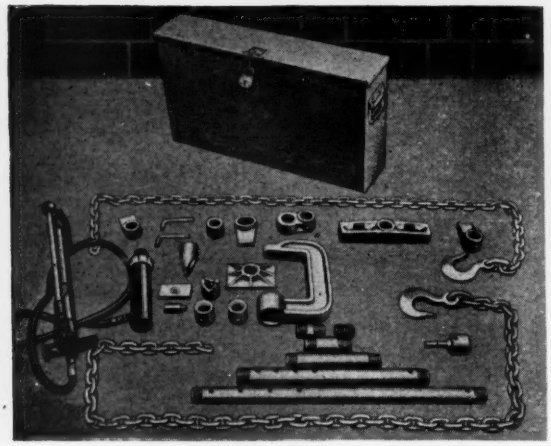

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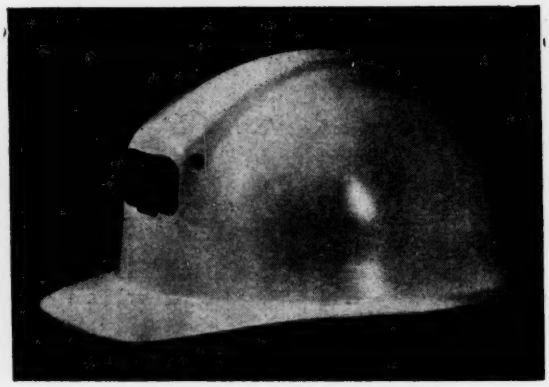

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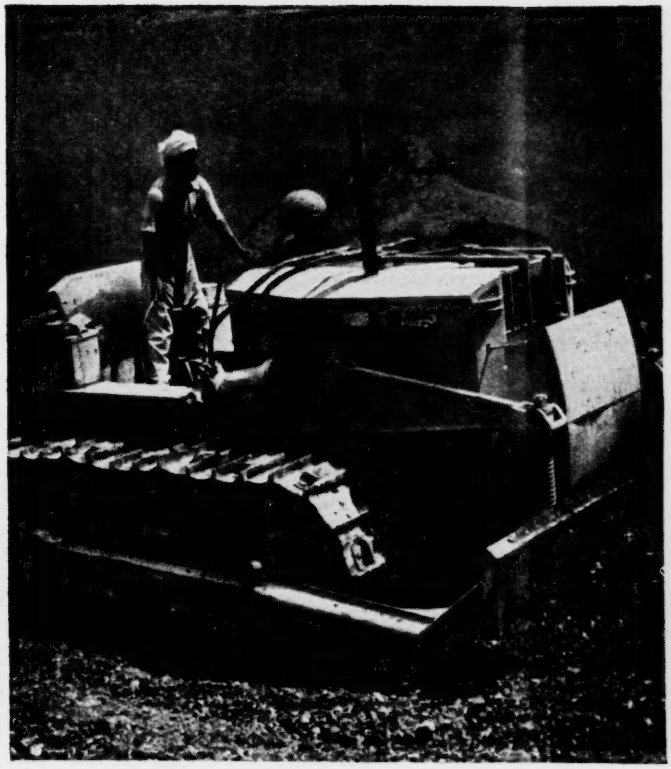

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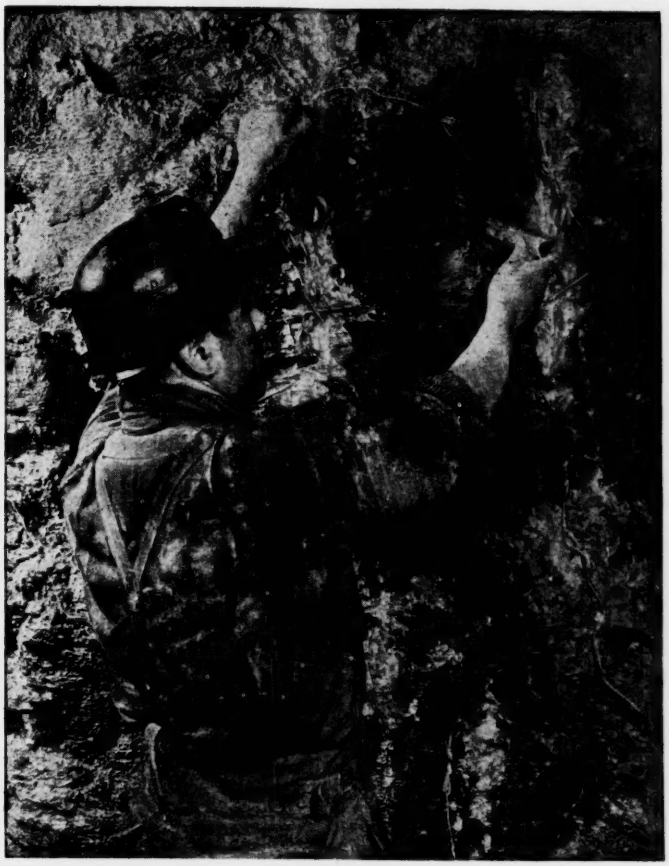

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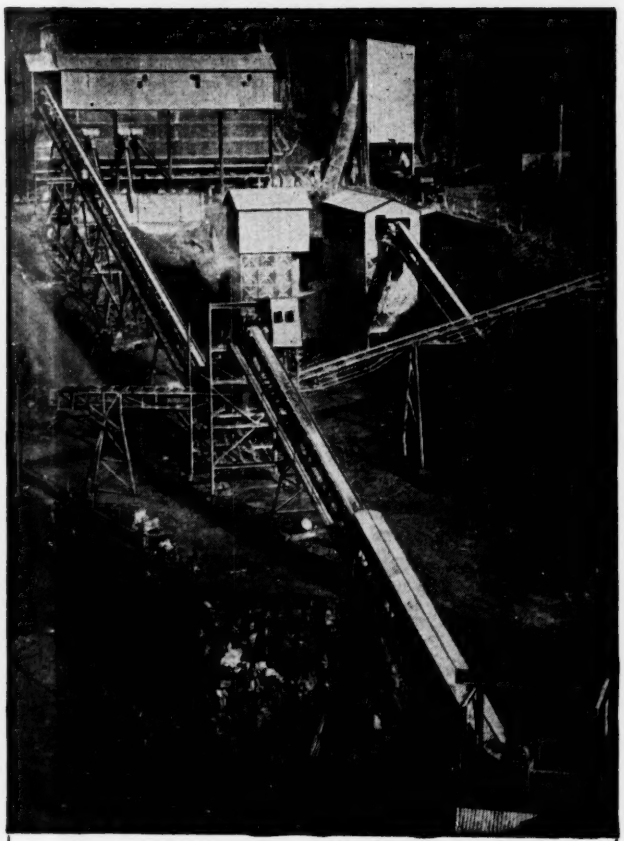

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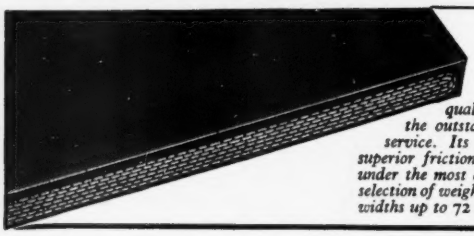

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The Mining Journal

Established 1835

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NOTES AND COMMENTS

Mr. Robert Annan Puts Kaffirs in Focus

The December Kaffir dividends so far announced, and noted elsewhere in this issue, have undoubtedly played an important part in removing some of the gloom which has shrouded the Kaffir market for many months. Some of the payments have been, as expected, lower than those announced in the corresponding period a year ago, but broadly speaking they have been much better than many had anticipated. Even so, the dividends to date announced do not reflect any marked change in recent earnings—the newer mines excepted—so that at best the improved declarations would only provide a fillip to a limited number of companies.

The real lift behind the market's recent general advance has doubtless been due to Mr. Robert Annan's review of the problems of the South African gold industry, a task which he ably achieved in his annual statement at the Consolidated Gold Fields of South Africa's meeting held towards the end of last week and reported elsewhere in this issue.

During the past year, Mr. Annan said, the gold mining industry maintained the scale of its operations but the slight increase in the yield of gold was insufficient to offset a further rise in working costs, together with a decrease in revenue from sales of gold at a premium. However, the use of average figures for the whole of the producing mines does not give a complete picture of the trend of current and future developments, for many of the producers are older mines which have passed their peak whereas mines now developing promise to yield ore of substantially higher grade than the average now being treated. Some of the newer mines, he declared, would undoubtedly have working costs above the present average when expressed as cost per ton milled but would, nevertheless, be more profitable as the vital factor was the cost per ounce of gold produced.

Turning to the Orange Free State, he said that technical difficulties have slowed down the rate of progress but none of them is new or insuperable and he believed that it would be unfortunate if their significance were to be exaggerated. Indeed, the prospects for the new mines being created there, in the Klerksdorp district and on the Far West Rand, were most encouraging.

Nor was this the only hopeful aspect. Another was the continued improvement in efficiency, particularly in the output by underground labour. An illustration of the value of this improvement was that the present labour force of the Consolidated Gold Fields group produced 2,000,000 tons of ore more than the same force would have produced nine years ago. Furthermore, the shortage of electric power which has been troubling the gold mining industry for some time past was gradually being overcome and it was anticipated, he said, that supply should overtake demand in 1955.

These favourable factors provide sound reasons for confidence in the gold mining industry and looking to the future he said that while there was no indication at this time of any change in official opinion in the United States regarding an increase in the dollar price of gold, he thought there was a growing body of world opinion that believed a change was inevitable if normal conditions of international trade were to be re-established.

Chile Resumes Copper Sales

Reports from Santiago this week indicate that the Copper Committee of the Chilean Central Bank has now resumed copper sales immediately on the world market. The instructions given to the Copper Committee appear to provide for sales, both from current production at world prices, and from Chile's surplus stocks at not less than 30 c. The latter may now be as high as 120,000 s.tons, three quarters of which is already in the States.

The Committee has made arrangements whereby sales on acocunt of current production are in effect to be made immediately from producers' stocks in the U.S., producers then being reimbursed with a corresponding amount of the metal from current production, which will be held in stock in Chile. In this way sales from current production will not erode the surplus stocks which at present the Copper Committee may not sell below 30 c.

This procedure for making sales from current production immediately available on the American market means that the test for copper prices is going to come rather sooner than might have been expected. Consumers' requirements for December are now presumably fairly well covered so that the first impact of Chilean sales must be looked for on

January deliveries. On both sides of the Atlantic consumers are living from hand to mouth and it, therefore, remains to be seen to what extent the normal improvement in January consumption will offset the additional metal coming on the market. It seems almost inevitable, however, that some fall in price should occur once the present pressure on spot metal eases.

It is a little surprising to find Chile preparing to sell current production before final plans for the disposal of surplus stocks have been worked out. However, now that the Chilean Senate has approved the disposal of the latter on a 30 c. basis, the Copper Committee may have good reason for thinking that Washington will be willing to resume negotiations for their disposal, and in any event, with the probability that world prices are unlikely now to remain as high as 30 c. for very long, the Committee may be regarding these stocks as already virtually off the open market.

It is now understood that a Bill will shortly be introduced in the Chilean Congress to remove the discriminatory exchange rate of 19.37 pesos to the dollar, at which the American copper companies at present have to acquire Chilean currency for local expenditures. In future, currency for those purposes will be available at the 110 pesos rate. The Bill is also expected to contain a new tax formula to enable the Chilean Government to collect as taxes an equivalent to the amount they will lose by the removal of the discriminatory exchange rate, and the whole basis of taxation is likely to be revised so as to stimulate the copper companies to invest new capital in Chile and expand output. Precise details of the Bill must, however, clearly depend on the outcome of current negotiations between the copper producing companies and the Government.

British Guiana's Manganese Deposits

In a note headed "Minerals Investigations in British Guiana" on page 656 of our issue of December 4 we referred to the interest which has been shown in the Colony's manganese occurrences in the neighbourhood of Arakaka Creek, the discovery of which we attributed to Major D. Lewes of the Barima Gold Mining Company.

While it is true that in recent years Major Lewes has been prospecting energetically in this area, our earlier note does not make it clear that the Colony's manganese discoveries are the direct outcome of field work by the Colony's Geological Survey, both in the years immediately preceding the last war and again during 1951.

During the years 1937 and 1938, in the course of their systematic surveys, officers of the British Guiana Geological Survey discovered zones of manganiferous deposits near Tasawinni, on the Pipiani and Farawaru rivers (tributaries of the Barama) and in the area immediately south-east of Arakaka (a settlement on the Barima river) in the north-western district of British Guiana. Some of those in the Barama area were considered to be of commercial grade and similar in composition to those on the Gold Coast. All these deposits were situated between the Barima and Barama rivers and *east of the old Barima-Barama Road.*

Subsequently these deposits were examined by geologists of a well-known American steel company, but they were considered to be too small to justify further development, having regard to their situation and other factors.

In January, 1951, two members of the Survey paid a brief visit to Arakaka in the course of which exposures of low grade manganiferous rocks were observed near the Perseverance trail and Manikuru river about a mile south-east of Arakaka, and during the same year a detailed prospection of the deposits in the Manikuru area was made by a company operating in this district and this was followed by investigation by another American mining company.

During the second field season of 1951 a member of the Geological Survey Department discovered manganiferous rocks in the area *west of the old Barima-Barama Road,* i.e., in an area where manganese deposits had not previously been observed. The manganiferous zone was found to extend for at least 10 miles to the west of the Barima-Barama Road, and in general it became thicker and more manganiferous to the west.

It is this area which we referred to in our issue of December 4 as being under detailed investigation by the African Manganese Company, and where we understand that manganese deposits have been found which may warrant development.

Western United States

(From Our Own Correspondent)

Portland, Oregon, November 30.

New Mexico Supreme Court has imposed jail sentences against six leaders of the International Union of Mine, Mill and Smelter Workers for violation of an injunction against unlawful picketing issued during a violent year-long strike against New Jersey Zinc Co.'s operation at Hanover. I.U.M. and M. is the union that was expelled from C.I.O. for being Communist dominated. National Labor Relations Board has announced a policy of denying certification rights to any union one or more of whose officers are under indictment for signing a false non-Communist affidavit, but a judge of the Federal District Court has ruled against the Board's attitude.

President Eisenhower has appointed a committee of four members of cabinet rank, headed by Secretary of the Interior McKay, to investigate matters affecting the mining industry and recommend a national mineral policy. The President stated that the action was taken because of the "depressed conditions" existing in many mining localities.

The National Lead and Zinc Committee has submitted a petition to the U.S. Tariff Commission in which it asks that the escape clause provided in the Acts of 1951 and 1953 be retained and requesting increase in tariff rates amounting to 50 per cent more than those existing on January 1, 1945. The General Services Administration has been instructed to sign no more contracts for maintenance of copper production until a review of the copper supply situation can be made.

THE LEAD-ZINC INDUSTRY

In the Coeur d'Alene district in Idaho a number of companies are trying to offset high costs of labour and supplies by resort to the "split check" system, in which a certain section of the mines is leased, generally to an employee. The usual agreement is that the lessee, or "tributer," supplies labour, powder and small tools and the company the compressed air and necessary mining equipment. Net proceeds of the operation are divided equally between the company and the lessee. Morning mine of the American Smelting and Refining Co. has succumbed to low prices and high costs and has closed down after continuous operation since 1885. At 5,200 ft. it is the deepest mine in the Coeur d'Alene district. In 1939, its banner year, it produced 24,000 tons of lead, 20,000 tons of zinc and 1,000,000 oz. of silver. The mill will continue to operate one shift on ores of the Frisco mine in the same locality.

In the Pioche district in Nevada Combined Metals Reduction Co. has practically ceased operations at its Castleton mine pending adjustment of the lead and zinc market.

To provide work for the men laid off development of the company's manganese and tungsten properties is being stepped up. After two years of Construction Pioche Manganese Co., affiliated with Combined Metals, has one 7,500 kVA. electric furnace at Henderson, Nevada in operation and producing ferro-manganese with a second similar furnace approaching completion.

A programme of road building involving an expenditure of $3,300,000 in the Colorado Plateau region is practically completed. It will be a great stimulus to production as the topography of the region is such that many of the producing properties have been practically inaccessible to vehicles. Somewhat along that same line a 300 ft. two compartment shaft is being sunk in the Big Indian Valley area by Cal Uranium Co. for the purpose of providing central hoisting facilities for a number of separate ore bodies in the vicinity. Anaconda Copper Co. has commenced operation of its uranium leaching plant at Bluewater, New Mexico, the ninth plant to be put on production in the Plateau area. It is adapted to the treatment of ores high in lime and differs somewhat from other plants that handle the more common sandstone ores. Anaconda is actively developing other properties in the Bluewater area.

Canada

(From Our Own Correspondent)

Blind River, Ontario, November 21.

Discoveries of uranium in the Algoma and Sudbury districts of Northern Ontario appear to be growing in importance. Although exploration is in the initial stage of surface trenching, test pits and diamond drill holes, yet official estimates suggest an aggregate of between 2,000,000 and 3,000,000 tons of ore of commercial grade has so far been indicated on the various properties. At the present price of uranium oxide, the average value of the ore is believed to exceed $15 per ton. In addition, there are various discoveries of low to medium grade on which no attempt has so far been made to prepare official estimates. One of the latest discoveries lies some 35 miles north from Sudbury in Roberts township where a quartzitic conglomerate structure of more than 20 ft. in width has been found to be radioactive and which is in course of being diamond drilled by Dyno Mines. More than 6,000 mining claims, comprising approximately 250,000 acres, have been staked out by mining companies and individual prospectors in the hunt for uranium deposits in the Algoma and Sudbury areas.

Dividend disbursements from Canadian mining companies have shown a sharp decline during 1953, being presently estimated at $117,500,000 for the current year, compared with $142,000,000 in 1952 and $145,000,000 in 1951. The decline in dividends was brought about largely by lower prices for base metals, plus rising costs of operation. Consolidated Mining and Smelting Co. reduced dividends by $12,000,000 this year compared with 1952, while International Nickel Co. of Canada paid $8,500,000 less this year than in the preceding year. The outlook is that the conditions which caused lower profits during 1953 will continue to exercise influence throughout the coming year.

Labour strikes have paralysed operations in the gold mining fields of Porcupine in Northern Ontario. Earlier indications that the men might return to work against the wishes of union leaders did not materialize. At only one mine have about 60 per cent of the men returned to their jobs. The prolonged strike is said to be costing the union more than $500,000 per month. There is no estimate of what the cost is to the operating companies, but it is obviously very heavy. The general impression in the Porcupine gold field is that the strike may prove to be one of particularly long duration. Meanwhile, labour strikes have also spread eastward into the Rouyn mining field of Northern Quebec—and with some fear that they may extend still farther east into the Malartic gold mining area.

SUSPICIONS OF "WHITE" PLAN FOR I.M.F.

Alarm is spreading in Canada that the articles framed by Communist Harry Dexter White, of the International Monetary Fund, along with the formerly suspected secretary of that organization, sanctions referred to as the White Plan, may have been deliberately designed to disrupt and disorganize the gold producing mines of the nations of the free world—a *bloc* calculated to prevent the price of gold rising in keeping with the uptrend of other commodities.

Another large nickel producing enterprise for Canada has become an established fact. The new railway of 145 miles has been completed to the Lynn Lake nickel mine of Sherritt-Gordon Mines in Northern Manitoba. By early in 1954 the rate of operations is expected to reach 2,000 tons daily. By that time the company's refining plant in Saskatchewan will have been completed. The objective of the new nickel enterprise is an annual output of 17,000,000 lb. of nickel, 9,000,000 lb. of copper, 300,000 lb. of cobalt and 70,000 tons of fertilizer. In addition a substantial income in royalties is expected from the newly developed process for refining nickel.

East Rim Nickel Mines, following an expenditure of $3,000,000, has come into production this week. The mill has a capacity of 500 tons daily and will begin shipping concentrates forthwith to the Falconbridge smelter.

Petroleum is on its way from Edmonton, in Alberta, to Sarnia, in Ontario. The 30 in. steel pipe line reached the refineries at Sarnia a few days ago, having spanned a distance of 1,762 miles and is believed to be the world's largest. The line is being tested for leakage, and as the petroleum is now working its way eastward to the refineries of Imperial Oil it is being preceded by about 100 miles of water. It may be about two weeks before petroleum of the rich Alberta field comes out of the easterly end of the line. Meanwhile, three mammoth tankers heretofore employed on the Great Lakes shipping route have been taken out of commission and are to be sold—the three ships are said to be the largest tankers in the world.

NEW BRUNSWICK DISCOVERIES

There is further evidence that the base metal deposits recently brought under exploration in the province of New Brunswick are of major importance. One of the more recent diamond drill cores drawn from the property of New Larder "U" Island Mines intersected a width of 150 ft. of ore which was found to carry 7.94 per cent zinc, 2.88 per cent lead, and 2.97 oz. of silver. This represented gross value of over $25 per ton at the present prices for zinc, lead, and silver. These results are encouraging other operators to prepare plans for geophysical surveys and diamond drilling. Among such neighbouring properties is one held by Joburke Mines which company has 16 mining claims a short distance east of New Larder. Preliminary work has indicated a large anomaly on the Joburke group on which work is to begin immediately.

Ontario Pyrites Co. continues to add to ore in sight and indicated on its properties in the Sudbury district. The company is controlled by Ventures Ltd. and Hoyle Mining Co. and is estimated to have more than 8,000,000 tons so far in sight in which the metal content has a gross value of close to $20 to the ton.

BELT CONVEYORS—III

Belt Tension and the Transmission of Horse Power

By A. GRIERSON, B.Sc., A.M.I.Min.E.

In the following article, the third in a series of seven, the relationship between the tension in a conveyor belt and the transmission of horse power is discussed. The necessity for a differential in tension between the carrying and return runs of a belt is emphasized, the primary functions of motor output are presented, while considerations of the distribution of tension are followed by reference to those features incorporated in an ideal tensioning device. Yet the essence of the article is, perhaps, contained in the formulae given under the heading "General Conclusions From Tests," for these provide the basis from which it is possible to assess, sufficiently accurately for all practical purposes, the cumulative horse power required for a conveyor operating under a set of given conditions.

In order to drive a belt it is necessary that there should be a difference between the tensions in the carrying and return runs of the belt. The smaller is termed the "slack" side tension and the larger the "tight" side tension, the difference being the effective or driving tension. This is the force effective in moving the belt and the load. The slack side tension maintains the belt under tension on the outgoing side of the driving drum and so provides the necessary adhesion between the driving drum and the belt. The effective tension $(T_1 - T_2)$ therefore represents the force which must be supplied to the belt from an external source of power. Hence the horse power required to drive a conveyor belt is expressed thus :

$$\text{H.P.} = \frac{\text{Effective Tension in lb.} \times \text{Belt speed in ft./min.}}{33{,}000}$$

$$= \frac{(T_1 - T_2)S}{33{,}000}$$

Neglecting centrifugal action the ratio of the tensions, T_1 and T_2 is given by the following expression :—

$$\frac{T_1}{T_2} = e^{\mu\theta}$$

where e = base of natural or naperian logarithms (2.718)
μ = coefficient of friction between the belt and the driving drum (0.25 - 0.3 for rubber belts on cast-iron pulleys ; 0.35 for rubber belts on lagged pulleys)
θ = arc of belt contact in radius.

The adhesion or friction between the driving drum and the belt is independent of the area of surfaces in contact, and thus to increase the power in a conveyor belt for a given belt speed it is necessary to increase the angle of wrap on the driving drum or the coefficient of friction. Increasing the angle of belt wrap is effected by introducing additional driving drums — either powered by the same motor or independently driven — and/or by insertion in the driving head of snub or guide pulleys. Either of these two methods has a limit of application in that if carried too far the increase in the T_1/T_2 tension ratio is not commensurate with the additional complication of drive. This is of especial importance where the conveyor is installed in restricted space underground such as at the face, and the design of the conveyor drive head may well be governed by the space available and the necessity to have an easily manoeuvreable unit.

Lagging a driving drum with rubber whilst increasing μ may have an adverse effect in that pieces of material become embedded in the lagging and so prove detrimental to the life of the belting. This rubber lagging is of the order of $\frac{1}{2}$ in. thick and may have grooves spaced $\frac{1}{2}$ in. or so apart, in parallel with the shaft or herringbone pattern.

The following table gives the ratio of tensions for various angles of wrap and coefficients of friction :

	Ratio $\frac{T_1}{T_2}$		Ratio $\frac{T_1}{T_1 - T_2}$	
Angle of belt wrap in degrees	*Bare Pulley* $0 = 0.25$	*Lagged Pulley* $\mu = 0.35$	*Bare Pulley* $\mu = 0.25$	*Lagged Pulley* $\mu = 0.35$
180	2.19	3.00	1.84	1.50
185	2.24	3.10	1.81	1.48
190	2.29	3.19	1.78	1.46
195	2.34	3.29	1.75	1.44
200	2.39	3.39	1.72	1.42
205	2.45	3.50	1.69	1.40
210	2.50	3.61	1.67	1.38
215	2.56	3.72	1.64	1.37
220	2.61	3.83	1.62	1.35
240	2.85	4.33	1.54	1.30
270	3.25	5.20	1.45	1.24
300	3.70	6.25	1.37	1.19
330	4.22	7.51	1.31	1.15
360	4.80	9.02	1.26	1.13
420	6.25	13.00	1.19	1.08
500	8.86	21.21	1.13	1.05
600	13.71	39.06	1.08	1.03

As will be apparent from mathematical considerations — and indeed it is illustrated clearly in the above table — the benefits resulting from increasing the angle of belt wrap are much more effective for the smaller contact angles. For example, considering the $T_1 / T_1 - T_2$ ratio it is seen that an increase from 180° to 185° belt wrap on rubber lagged pulley decreases ratio from 1.50 to 1.48 whilst in order to effect a comparable ratio reduction from 1.05 to 1.03 an increase of from 500° to 600° belt wrap is necessary. This brings home the point made previously that increasing belt wrap has a constructional limit of application.

PRIMARY FUNCTIONS OF MOTOR OUTPUT

In a belt conveyor the output of the motor, after accounting for transmission losses through the gearing, is expended in performing the following primary functions :

(1) Driving the empty conveyor (this is virtually independent of gradient) ;
(2) moving the material horizontally ; and
(3) moving the material vertically.

Each of these divisions can be further split up into component parts thus :

Power to drive the empty conveyor is utilized to ;

(a) Revolve the idlers with weight of empty belt on them ;
(b) revolve the terminal and any intermediate drums ;
(c) cause the belt to trough (unless belt runs flat) ; and
(d) bend the belt around terminal drums as it flexes up and down over the idlers.

Power to move the material horizontally is due to ;

(a) Increased effort to revolve the idlers due to weight of load on belt ;
(b) increased force required to revolve the terminal and any intermediate drums due to increased tension in the belt ;
(c) additional power to maintain the mass of material in a troughed form (unless the belt runs flat) ;
(d) additional power to bend belt around terminal drums and over idlers due to greater tension in the belt ; and
(e) power to accelerate the material up to belt speed as it is discharged on to the conveyor at the loading point.

Power to move the material vertically is made up of ;

(a) Power to move vertically at a given speed. This may be a positive or a negative value depending on whether the load is lifted or lowered ;
(b) added power to revolve the terminal shafts due to increased tension in belt because of load ;
(c) added power to bend the belt around pulleys due to increased tension.

Of all the twelve individual power requirements listed, the only one which can be given a definite theoretical value is that dealing with the power expended in moving the load vertically. Considering the other factors so much depends upon the operating conditions that even were it possible in some cases to assign theoretical values this would involve extremely long and complex calculations. In practice the only means of obtaining the power requirements of a conveyor is by means of tests. From these one can obtain the power requirements and graphs can be made and formulae derived which, although not giving individual values to each of the twelve listed items, will enable one to assess sufficiently accurately for all practical purposes the cumulative horse power required for a conveyor operating under a set of given conditions.

GENERAL CONCLUSIONS FROM TESTS

From many such tests carried out on conveyors the following general conclusions are apparent : the relation between conveyor length and horse power is linear and if H.P. be taken as the ordinate and conveyor length as abscissa the line does not pass through the origin. Thus each line can be represented by a graph having the general equation $y = mx + c$

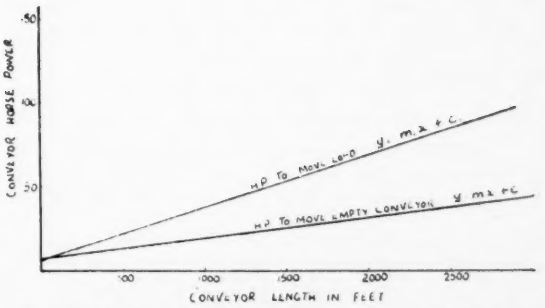
where y = horsepower.
x = conveyor length.
m = tangent or rate of change of H.P. with change in conveyor length. The value of m depends on some friction factor and the rate at which work is done.
c = horsepower required independent of conveyor length.

Considering H.P. to drive empty conveyor letting W be the weight of the belt and moving parts of the idlers in lb. per foot run of conveyor and F be the friction factor then the pull required per foot of empty belt is WF lb. With a belt speed of S feet per minute the H.P. per foot of conveyor run is :

$$\frac{WFS}{33{,}000} \text{ and thus total H.P.} = \frac{WFSL}{33{,}000}$$

where L is length of conveyor in feet. In order that this formula may be of use, values of W and F are required. W may be measured directly and depends on belt thickness, size and spacing of idlers. Typical values of W are as shown :

Belt Width (ins.)	24	30	36	42	48	60
W in lb.	20	25	35	45	55	70



Graph showing relationship between conveyor length and horse power

In order that the value of F may be determined it is necessary to carry out a test on the conveyor ; figures of such a test upon a 60 in. wide conveyor carrying 1,500 tons per hour at 490 ft./min. are appended.

Conveyor Length in feet	*H.P. to drive empty conveyor*	*H.P. to drive loaded conveyor*	*H.P. to move load (By difference)*
200	9.0	20.8	11.8
300	10.1	26.0	14.9
400	11.4	29.4	18.0
500	12.8	33.9	21.1
800	16.4	46.8	30.4
1000	19.1	55.9	36.8
1200	21.3	64.3	43.0
1400	24.0	73.2	49.2
2000	31.4	99.3	67.9

The results of this test, represented graphically, show that WFS / 33,000 being the H.P. to drive 1 ft. of conveyor is the rate of change of H.P. and thus corresponds to m in the general equation $y = mx + c$. Consequently, by measuring or calculating the value of m from the graph and equating this to WFS / 33,000 thus can F be determined. In this instance the weight of belt and idlers per ft. was 67 lb. and m as found from the graph 0.0125. Thus,

$$0.0125 = \frac{67 \times 490 \times F}{33{,}000}$$

$$F = 0.0126.$$

If the graph of empty belt Horse Power $y = mx + c$ passed through the origin the expression for empty belt would thus be :

$$\text{H.P.} = \frac{0.0126\ WSL}{33{,}000}$$

However, as the line cuts the ordinate at a distance above the origin it is necessary to add some H.P. corresponding to c in the general equation. This added H.P. is independent of the length of the conveyor but it is related to weight of belt and rotating parts of idlers in its per ft. run and the speed of the conveyor in ft. per min., i.e. added H.P. $\propto$ W.S. Thus :

$$6.7 = k \times 67 \times 490$$

$$k = 0.000204$$

Thus the final expression for H.P. to drive empty belt is :—

$$\text{H.P.} = \frac{FWSL}{33{,}000} + kWS$$

Substituting K for $\frac{F}{33{,}000}$ we have

$$\text{H.P.} = KWSL + kWS$$

$$\text{for empty conveyor} = WS\ (KL + k)$$

Values of K and k vary widely as so much depends upon type of bearings and degree of conveyor maintenance. The installation referred to in the accompanying illustration is a first class conveyor in perfect running order and consequently values of K and k are less than normally met with in practice.

The H.P. required to carry material horizontally is the H.P. necessary over and above that required for the empty

conveyor. Letting T be the tonnage carried per hour and P be the friction factor. If S is the belt speed in feet per minute then the weight of material in lb. on each foot of the conveyor is :

$$\frac{T \times 2240}{S \times 60} \text{ or } \frac{37.33T}{S}$$

Therefore, the H.P. for each foot of conveyor is

$$\frac{37.33\ TP}{S} \times \frac{S}{33{,}000} \text{ or } 0.00113\ TP.$$

Since this is the rate of change of H.P. it corresponds to m_1 in the straight line formula. Thus by determining m_1 from graph as before and equating to 0.00113 TP the value of P the load friction factor can be found:

$$m_1 = 0.00113\ TP$$
$$0.0324 = 0.00113 \times 1500 \times P$$
$$P = .01913$$

Thus it is seen that there are two quite separate friction factors, F for the empty belt and P for the load, in this instance having respective values 0.0126 and 0.01913. In the earlier days of belt conveying, and indeed in many cases at the present time, it was usual to use one common friction factor for both the dead and the live loads. An average factor, however, can only give accurate results if the ratio between dead and live loads is constant.

The added H.P. indicated by the interval C_1 is independent of the length of the conveyor but is related to the output from the belt and is a measure of the H.P. required by the terminals of the conveyor.

From the previous illustration the added H.P. equivalent to C_1 is approximately 5.95.

Therefore from $C_1 = eT$ where e is constant whose value is sought

$$5.95 = ex1500$$
$$e = 0.004$$

The H.P. to move load horizontally may then be expressed.

$$H.P. = 0.00113\ TPL + eT$$

Total H.P. required by a conveyor is thus—

$$WS\ (KL + k) + T(0.00113PL + e)$$

Although the values of K, k, P and e are best found from practice the following table gives an indication of the values which usually obtain.

Operating conditions	*K* (F/33,000	*k*	*P*	*e*
Plain bearing idlers. Average conditions.	$10^{-6} \times 2$	$10^{-3} \times 0.35$	0.073	0.002
Commercial anti-friction idlers. Average conditions.	$10^{-6} \times 0.8$	$10^{-3} \times 0.35$	0.042	0.002
High grade anti-friction idlers. Good conditions.	$10^{-6} \times 0.5$	$10^{-3} \times 0.2$	0.022	0.004
Finest grade anti-friction idlers. Excellent conditions.	$10^{-6} \times 0.4$	$10^{-3} \times 0.2$	0.019	0.004

In mining operations the author has found that the values appertaining to conveyors using commercial anti-friction idlers give reasonably consistent results.

The H.P. required to convey the material vertically can be found quite easily by elementary mathematics and is as indicated:

	H.P. per 100 yards on gradient								
Load Ton/hr.	1:50	1:30	1:20	1:15	1:10	1:8	1:6	1:5	1:4
100	0.68	1.13	1.7	2.26	3.4	4.4	5.7	6.8	8.5

Other loads are in direct proportion to above values.

When conveying up the gradient the H.P. required to move load vertically is added to the total H.P. to drive horizontal conveyor whilst if the gradient is in favour of the load the values are subtracted. In the latter case it is imperative to bear in mind that in no case should H.P. of motor be less than that for the empty belt.

The following article will serve to illustrate what has gone before. Considering a 42″ wide conveyor using 8-ply 32 oz. duck belt and operating on a gradient of 1 : 20 against the load. Lagged driving pulleys are used having a total belt wrap of 240°. What is the maximum length at which the belt can operate if it is to carry 300 tons of ore per hour and travel at 300 ft./min. ? The weight of belt and rotating parts of idler are found to be 60 lb. per foot run.

The maximum permissible belt tension is 28 lb./inch/ply. Thus maximum safe working tension T_1 is $28 \times 8 \times 42 = 9{,}408$ lb.

From the table it will be seen that for a belt wrap of 240° and a co-efficient of friction of 0.35 the T_1 / T_2 tension ratio is 4.33.

$$\therefore \text{ Effective tension } (T_1 - T_2) = T_1\left(\frac{1\text{-}1}{4.33}\right) = 0.769\ T_1$$

Hence effective tension $= 0.769 \times 9408 = 7230$ lb. approx.

$$\therefore \text{ Maximum H.P. belt can transmit} = \frac{7230 \times 300}{33{,}000} = 65 \text{ say.}$$

Letting L be unknown length of conveyor in ft.

Empty belt H.P. $= WS(KL + k) = 60 \times 300\ (0.0000008\ L + 0.00035)$
$= 0.0144\ L + 6.3$

Load H.P. $= T\ (0.00113PL + e) = 300(0.00113 \times 0.042L + 0.002)$
$= 0.0142L + 0.6$

Vertical H.P. $= \frac{L}{20} \times \frac{300 \times 2240}{60 \times 33{,}000} = 0.017L$

$\therefore$ Total H.P. $= 0.0144L + 6.3 + 0.0142L + 0.6 + 0.017L$
$= 0.0456L + 6.9$

Now $0.0456L + 6.9 = 65$

$$L = \frac{58.1}{0.0456} = 1272 \text{ ft.}$$

Whilst maintaining a constant output of ore there are three means by which belt length may be extended beyond the figure derived above :

(1) Stronger belting may be installed—this has the disadvantage, that cost may be prohibitive (an extra ply of duck, say 36 in. wide, 42 oz. grade, may cost an additional 5s. per foot) ;

(2) existing belting may be overstressed — this is undesirable because of consequent damage to belting ;

(3) belt speed may be increased. This is the more usual method but necessitates, of course, a bigger motor and driving unit. By increasing the belt speed from 300 ft./min. in the previous example to 450 ft./min. the H.P. that can be transmitted by the belt is increased by 50 per cent to 97.5. Thus total H.P. of conveyor—

$$0.0216L + 6.3 + 0.0142L + 0.6 + 0.017L = 97.5$$
$$\therefore L = 1716 \text{ feet.}$$

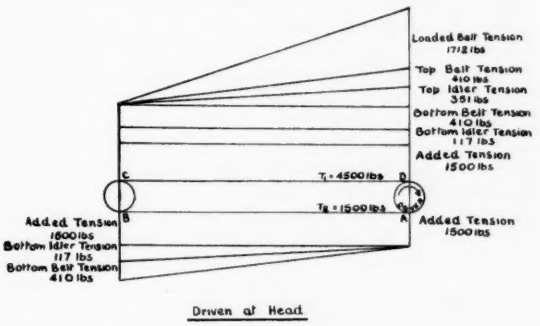
It is seen that by increasing belt speed by 150 ft./min. the optimum length of the conveyor may be extended from 1272 feet to 1716 feet.

Alternatively, if H.P. transmitted be kept constant an increased belt speed will result in a decreased maximum belt tension and consequently less powerful belting is required. There is a limit to conveyor belt speed both from a safety and an economic aspect. This will be more fully dealt with subsequently.

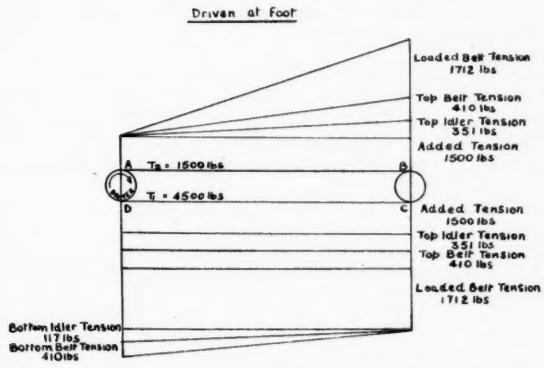
DISTRIBUTION OF TENSION

The distribution of tension in a conveyor belt does not lie uniformly over the length of the conveyor as will be seen from consideration of the accompanying illustration which shows the distribution of tension in a horizontal conveyor fully loaded and driven at head and foot respectively.

Conveyor driven at head : Taking the initial tension in the belt from the take up (added tension) as being 1500 lb. the tension at point A is 1500 lb. Along the return runs is added a further tension of 117 lb. due to frictional resistance



DISTRIBUTION OF TENSION IN HORIZONTAL CONVEYORS



of bottom idlers and 410 lb. due to the frictional resistance of the bottom belt. This gives at point B a total belt tension of 2027 lb. which will be transmitted around return drum and so will exist at point C. On the loaded run of the conveyor the following tensions will be added. Frictional resistance of top idlers 351 lb. : frictional resistance of top belt 410 ; and 1712 lb. frictional resistance due to load. Thus at point D the total or tight side tension T_1 is 4500 lb. the effective tension being therefore 3000 lb. Conveyor driven at foot : With the drive at the receiving end the belt tension distribution is as follows : Commencing at point A the initial or added tension will be 1500 lb. as before. The tension on the loaded run being 2473 lb. the combined tension at point B is 3973 lb. this existing also at point C. On the return run a further 527 lb. is added giving at point D a total tight side tension of 4500 lb. The effective tension is 3000 lb. as before.

It should be noticed in this example that the tension at the non-driving terminal is 7946 lb. as against 4054 lb. in the previous case, thus giving an increased pull causing bending on the shaft and greater wear on the bearings. This is a point to be borne in mind when considering the best position for a driving head.

Similar tension diagrams can be constructed to show distribution of tension in conveyors operating under any conditions.

TENSIONING DEVICES

The ideal tensioning device should possess the following features :

(1) It should be capable of applying equal tension across the width of the belting ;

(2) it should apply tension gradually ;

(3) in the event of the load on the conveyor varying, the applied tension should be capable of correspondingly increasing or decreasing ;

(4) the actual value of the applied tension should be known, thus preventing overstressing the belting ; and

(5) it should automatically take up any slack or stretch in the belting.

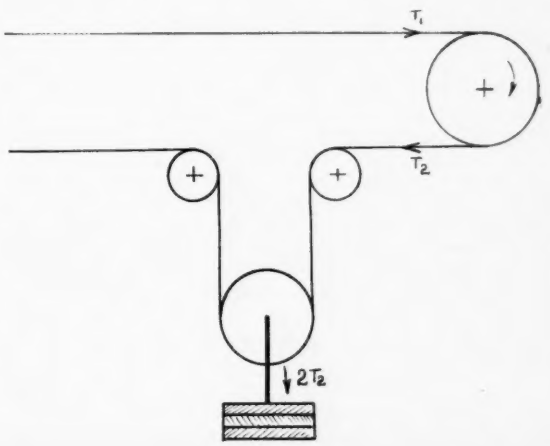
The principal methods of obtaining the slack side or added tension are by the use of the gravity take-up.

This is the only tensioning device which gives all the desirable features and consists of a weighted loose drum introduced onto the return strand of the conveyor belt at some judicious point. Its operation will be clearly apparent on referring to the illustration and the best position of this tensioning apparatus is normally immediately behind the driving unit thus eliminating slack which would otherwise occur. The counterweight is made in sections so allowing for incremental adjustments should the duty of the conveyor vary, the load in every case being twice the working slack side tension. Frequently, the weight is fitted loosely on vertical tubes on which it can slide, although various modified forms can be easily designed to suit requirements. This is the most efficient type of tensioning arrangement and is to be recommended on all heavy duty conveyors. Care must be exercised to ensure that if a tensioning weight sump be used it is kept free of water. The objection to the gravity take-up is that it gives the belt three extra bends.

OTHER FACTORS

Loop take-up gives a reasonably accurate tensioning and also acts as a reservoir for storing short lengths of belt. With this method there is no direct indication of the magnitude of the tension and there is often the danger that the moving drum may get out of alignment so causing the belt to double over. This may give on occasion a jammed belt with its attendant danger of heating.

Screw take-up has the advantage of simplicity and cheapness and is located at the foot of the conveyor. As with the loop take-up the amount of tension exerted in the belt can only be gauged by experience and negligence may result in tightening the belt beyond the required amount necessary for driving contact. The length of take-up travel is limited to about ten feet as it is inadvisable to have a longer unsupported length of belt between the first set of idlers and the fully extended tension pulley. It is essential that equal travel be made by each side bearing block when carrying out adjustment.



Gravity take up

Apart from the tensioning devices enumerated some provision must be made to anchor the terminal pulley and induce a measure of rigidity to the structure. Anchor chains or bars are used for this purpose and if the conveyor is fitted with a sliding tail end, some degree of tensioning can be achieved when anchoring.

Belt slip and belt creep are two factors often mentioned in treatises on belt conveying but whilst the action of the former is apparent, belt creep is not so universally understood. Belt slip results from a relative movement between the belt and the drving drum, being 100 per cent if the belt is stationary whilst the drum revolves within it. This will occur if the added tension from the tensioning device is ineffective or if a belt jams at some point along the run. Belt slip will decrease as the driving drum begins to pick up the load and will be least when drive is working properly. Belt slip is often caused in cold weather, the belt being stiff and frosty and the co-efficient of friction between drum and belt lowered. It is then necessary to apply additional slack side tension until the pulleys take a grip on the belt and then the slack side tension can be reduced to its normal value.

Belt creep is not so well understood, as it cannot be seen. It is caused by the difference in belt tension between the ingoing and outgoing sides of the driving drum(s). It is the elastic change in belt length on a pulley and is greater with increase in the T_1/T_2 tension ratio. Consequently its effect is more pronounced on tandem and three drum drives. A length of conveyor belt measuring 12 inches under no tension may be stretched an additional $\frac{1}{8}$ in. as it reaches the first driving drum, but when the belt leaves the final drum the tension may be so low that the stretch is practically zero. This in effect means that the belt has shortened $\frac{1}{8}$ in. per ft. as it passes through the drive. With a belt speed of 300 ft. per min. when leading onto the first driving drum the creep is therefore 37.5 inches per minute. The wear on the driving drum rim is represented by movement of two surfaces under great pressure having particles of grit between them. Belt creep is unavoidable but if the belt is kept clean the resulting damage to belt and drums is not severe.

The Production and Uses of Beryllium—II

By A. G. THOMSON

The value of beryllium as an alloying element was discussed in the first portion of this article, which appeared in our issue of December 4, 1953. In the following and closing instalment, the properties and applications of the metal are considered, as well as its availability and supply.

Beryllium is only slightly heavier than magnesium, its density being 1.84. Apart from brittleness at low temperatures, it has good mechanical and electrical properties. An ultimate tensile strength of over 20,000 lb./sq. in. and a Brinell hardness of 114 have been recorded for metal 99.5 per cent pure. The modulus of elasticity is 37,000,000 lb./sq. in., which is higher than that of any other metal apart from some members of the platinum group. The thermal conductivity is 0.385 cals./cm./$cm.^2$/deg. C. and the resistivity 12.2 ohms./cm. cube. The chemical properties closely resemble those of aluminium and include good resistance to atmospheric and hydrochloric acid corrosion.

The principal use of beryllium is as an alloying agent to harden and strengthen other metals, chiefly copper. Beryllium copper offers the strength and hardness of many steels, yet is non-magnetic, has good conductivity, and is resistant to corrosion and fatigue. Because of this unusual combination of properties, it can often solve design problems involving conflicting requirements.

DEVELOPMENT OF MILL PROCEDURES

In order to meet the many demands for beryllium copper, leading producers in the U.S. pioneered the development of mill procedures for the rolled and drawn product, and also developed a number of new wrought alloys. The establishment of proper techniques has resulted in the availability of uniform beryllium copper in strip, rod, bar, and wire form. In the heat-treatable condition the material is soft and can readily be worked. It is fabricated by standard production methods; strip, for example, is easily blanked, formed, deep drawn or spun, while rod and bar respond to hot or cold forming methods, including forging, machining and swaging. After fabrication a simple low-temperature heat treatment imparts a high degree of hardness and tensile strength.

Season cracking, hydrogen embrittlement or dezincification apparently do not occur in beryllium copper. Although the material will in time stain and darken like copper when exposed to humid or sulphur-bearing atmospheres, tarnish does not affect its mechanical properties. The resistance offered to warm and humid air indicates good service in tropical environments.

Aircraft designers specify beryllium copper for parts which must function repeatedly without failure, typical examples being propeller bolts, fuel injectors, de-icing studs, instrument switch parts, and safety belt releases. In the motor industry the many parts for which this material is used include wire clips, dimmer switch terminals, windscreen wiper springs, and door switch springs. Thousands of beryllium copper parts only $\frac{9}{16}$ in. long are stamped out daily at high speeds to be used on miniature tube sockets for radar and other electronic equipment. The production of non-sparking tools is another important field of application.

Excellent casting characteristics, coupled with good hardness and wear resistance in the age-hardened condition, make beryllium copper especially suitable for the production of precision castings through the lost-wax or investment casting techniques. In spite of the higher initial cost, finished parts are frequently cheaper in beryllium copper than in steel. Compared to other non-ferrous alloys they are harder and give longer life through increased wear-resistance.

Various commercial alloys are available, each offering a combination of useful properties. These materials are essentially ternary alloys of copper and beryllium, with small additions of cobalt or nickel which have proved helpful in retarding grain growth and in stabilizing age hardening response. Beryllium additions are made to a number of metals and alloys other than copper.

One of the oldest uses for beryllium is in the manufacture of beryllium X-ray tube windows, which were produced by die-forging as long ago as 1926. It was already known that beryllium is 17 times as penetrable by X-rays as aluminium and is not adversely affected by them. The windows were relatively thick, however, as brittleness and absence of malleability made it impossible to machine or grind thin sections of beryllium. It was found that small additions of

titanium in a specially constructed vacuum furnace reduced the beryllium oxide to beryllium. By using this technique with beryllium of the highest purity, sheets are now produced in standard thicknesses of 0.020 in., 0.010 in., and 0.0040 in.

Beryllium oxide is used in the electrical industry for filament coatings in lamps, electrodes in electron tubes, and as a cathode heating element in radio tubes. It is also used in electrical heaters in which the resistance wire is embedded in the refractory. Because of its high resistance to thermal shock it is useful as a radiation shield around graphite crucibles. Special purpose crucibles and other refractories are also made from beryllium oxide.

Highly sintered beryllium oxide is characterized by its great hardness and by good electric insulating and thermal conducting qualities at high temperatures, which are of special importance when the material is used in the form of cores, rods or plugs to prevent heater-cathode-leakage in wireless valves. In many applications its comparatively light weight is of great importance.

Beryllium oxide is also notable for its large infra-red and blue radiations at high temperatures. It is therefore used in incandescent lamps as a coating to increase the light and life efficiency of the filament and to reduce vaporization, especially in the presence of gas pressure.

IS BERYLLIUM TOXIC ?

In recent years considerable publicity has been given to the toxic qualities of beryllium compounds, but examination of the available evidence suggests that this metal's reputation for toxicity is largely based on misconceptions. Some chemical compounds of beryllium are poisonous. Beryllium fluoride, for example, is very dangerous, but so is any compound of fluorine when breathed in the form of dust. So, too, is any metal or metallic compound when breathed as dust. Many manufacturers have been fabricating beryllium alloys for 15 years or more without a single case of poisoning.

There are three types of disease associated with beryllium compounds. One is a form of dermatitis caused by beryllium introduced into cuts when handling the material. There appears to be conclusive evidence that this rash is caused by the rather high percentages of fluorine found in some reputedly "pure" metals. It can be controlled by wearing gloves. There is also an acute form of pneumonitis caused by inhalation of beryllium plus an acid radical. Most of these cases show a recovery. Finally, there is a delayed pneumonitis, against caused by breathing a dust of beryllium plus an acid radical. The death rate in this last type of disease is high. In all three cases it is a chemical form of beryllium which proved dangerous. The commercial alloys of beryllium are as safe to handle as any other commercial alloys, but the protection of workers obviously calls for the same precautions during processing as those common in any modern plant handling other metals such as copper.

FUTURE PROSPECTS

During 1951, the supply of beryllium became critical as a result of increased military orders, coupled with an expansion of civilian demand, particularly for beryllium-copper semi-fabricated items. The situation was aggravated by legislation in Brazil, which held up exports, resulting in a severe shortage of beryl ore. U.K. plants continued to produce ternary alloys for fabrication, but master ingot supplies were not coming forward in sufficient quantities from the United States.

U.S. Government research programmes to increase supplies were sponsored by the Defence Materials Procurement Agency. Attention was focussed on the recovery of beryllium-bearing material from domestic low-grade ores through beneficiation. The U.S. Bureau of Mines undertook an extensive programme of ore dressing, metallurgical and field research. The Geological Survey continued the mapping of areas containing beryl deposits. Technical assistance was rendered by E.C.A. for the development of beryl supplies in Africa. These efforts to develop increased supplies were reinforced by conservation measures, such as the introduction of new alloys containing smaller percentages of beryllium.

The expansion of world production, together with the resumption of exports from Brazil, have led to a substantial improvement in the supply position, which has been further eased in recent months through the reduction of armament programmes. One of the leading importers of ingots into the U.K., the Beryllium Smelting Co. Ltd., reports that adequate ore supplies are now available and capacities of U.S. ingot producers have been increased. No difficulty is being experienced in meeting British requirements which, over a period, have steadily increased.

What of the long-term future ? The authors of the Paley Report hold that, though extremely useful, beryllium could be replaced entirely or partially in many applications without serious harm. It is pointed out, however, that most substitution has been the effect of scarcity conditions, and the trend would probably be reversed if the supply should be increased through the availability of more ores or a decline in military demands. The properties of beryllium are regarded as sufficiently unique to indicate a continued strong peace-time demand, even at the present high price. Users of beryllium in the form of copper alloys are at present paying about £17 10s. per lb., compared with about £33 per lb. for metal 99.6 per cent pure.

THE SUPPLY QUESTION

On the basis of the projected growth of beryllium-using industries—such as aircraft, electrical manufacturing, aluminium, refrigeration and air conditioning—the Paley Report considers that by 1975 the U.S. demand for beryl ore may well have increased to three times the 1950 figure. In fact, possible increases in the atomic energy programme might lead to an even greater expansion of demand. On the other hand, attempts to lower the beryllium content of alloys, if successful, might save as much as 30 per cent of beryl ore supplies.

Taking all these factors into account, the Paley Report forecasts that in 1975 the U.S. will be consuming 7,500 s.tons of beryl annually compared with 3,145 tons in 1950, of which 6,300 tons (net) will be imported. Consumption in the rest of the free world is expected to be about 3,500 s.tons of beryl, against 1,000 tons in 1950.

The total free world reserves are placed at about 190,000 s.tons of inferred commercial beryl reserves. With increased exploration and development, and with improved methods of beneficiation, some of which are now being developed, these reserves appear sufficient to meet projected total free world requirements.

Argentina and India are again in production, and estimated reserves in these countries could probably support an output of at least 1,000 tons annually. Output in Africa is expanding rapidly. Negotiations are being carried on for the construction of plants in Brazil to expand output and develop more intensively Brazil's vast resources.

Since it appears that physically the known reserves are capable of supporting an even greater demand than that projected, the outlook for supplies will depend primarily on political and economic circumstances. Subject to these limitations, prospects for both producers and users of beryllium can be regarded as reasonably encouraging.

New Methods and Applications in the U.K. Coal Industry

The benefit of practical experience in the development of new methods and applications in the United Kingdom's coal industry, has recently been revealed in a series of reports issued by the National Coal Board. The reports, here presented in abridged form, describe original applications of traditional units of equipment, adapted or developed by local officials or by workers on specific collieries.

Two systems to speed up mine drifting and lower its mechanical maintenance costs by the use of shuttle conveyors have been devised in the North Eastern Division. The first system, which has been operated in a 16 ft. by 10 ft. drift at Manvers Main Colliery, uses two Eimco 21 rocker shovels with a retractable shuttle conveyor running in between them. A boom carrying three drills is mounted on a bogey which runs in channel irons fixed to the conveyor structure. After a round of holes has been drilled, the bogey is run back to the delivery end of the shuttle conveyor and the rocker shovels are brought up to the face. Attached to the rear end of each shovel is a right-angle chute mounted on wheels and running on the shovel's track. Each chute receives the broken stone from its shovel and delivers it on to the shuttle conveyor. The conveyor, which in turn delivers on to a main or gate conveyor, is also mounted on rails and has a small haulage winch to pull it to and from the face. The conveyor frame is fitted with a v-shaped plough which clears a path as the conveyor moves up to the face.

In the second system a single Eimco 40 rocker shovel is used for loading stone direct on to the shuttle conveyor in narrower headings. Mounted on wheels, the shuttle conveyor is 19 ft. long and is attached to the shovel by a drawbar. It runs on the same track as the shovel. The conveyor's mounting is high enough to allow it to run over the tail end of the gate conveyor. A small chute is fitted to the delivery end of the shuttle conveyor so that the stone is offloaded with a minimum of shock.

DEVELOPMENTS IN EFFICIENCY

Two other improvements in face working efficiency may be classed purely in the category of developments, and respectively include a pit prop footplate and a mushroom bollard.

The pit prop footplate, aimed at minimizing floor penetration, has been developed at Gedling Colliery, near Nottingham, according to a recent announcement by the National Coal Board. The footplate is in the form of an inverted bowl, the centre of which is thickened to a point projecting downward. The top of the device is dinted to provide a spherical bearing surface for the prop foot.

The principle of the footplate is that as the resistance offered by the prop to roof movement begins to exceed the resistance of the floor to penetration by the plate, the floor will be forced up inside the plate. The interior shape of the latter will cause the soft material of the floor to be compressed to a hard mass, and a pressure cone will be formed. This will tend to minimize the flow of the floor material outward past the edges of the plate and a high resistance to penetration will be developed.

The second development of interest is a mushroom bollard which, when attached to a standard coal undercutter makes a vertical cut in the coal seam, and has been developed by National Coal Board engineers in the East Midlands and South Western Divisions.

Mounted at right-angles to the cutter jib's top plate, the bollard is a circular post fitted with cutter picks along its full length, the picks being placed every 90 deg. on a helix of 2 in. pitch. The bollard can be of any length, according to the height of the seam to be worked. It is ball-bearing mounted and driven by the cutter chain. Considerable alterations have to be made to the jib to accommodate the bollard.

An original unit which automatically separates full and empty coal tubs is a self-acting switchpoint designed by an enginewright at Trimdon Grange Colliery, Co. Durham. The inner rail of the switchpoint is balanced so that when a full tub runs on to it and passes over the fulcrum it is tipped downwards by the tub's weight. The tipping of the rail operates a lever unit which swings the points into position to take the tub on to the full road. After the tub has passed over the points the whole sequence is reversed by a counterweight on the layer unit and the points return to their original position. Empty tubs will not operate the mechanism.

A further beneficial adaption is reported from Scotland. Since acquiring a David Brown 50TD diesel crawler tractor the East Fife Area of N.C.B. (Scottish Division) have found many uses for the machine, which serves 11 collieries.

One application is in the building of a new tip for the Michael Colliery at East Wemyss, on the banks of the Firth of Forth. First, a temporary line is laid from the colliery to the site selected for tipping. As the slag is tipped from wagons alongside the line, the David Brown crawler tractor, which is fitted with Blaw Knox hydraulic angledozer, levels it off. Platelayers then jack up the outside rail, and pack it loosely with ballast until it lies about the same height as the newly levelled slag.

Working from the opposite and lower side of the line, the crawler tractor drops its angledozer into position against the butt ends of the sleepers and pushes a line, a section at a time, sideways into its new position.

SAFETY WINDING DEVICE

Nor has safety engineering been neglected, as a device to give immediate warning to a colliery winding engineman if the engine be started before the keps supporting the cage at the pit bank have been withdrawn, has been invented at Thoresby Colliery, Notts. An accident of this kind occurred at Thoresby two years ago, when 50 ft. of slack rope coiled on top of the cage before the keps were withdrawn. The rope broke when the cage fell down the shaft to the pit bottom.

The invention consists basically of two switches, so connected that when both are closed an alarm is sounded. One of these switches is operated by the keps and is closed when they are under the cage. The second switch is controlled by a photo-electric cell which detects movement of the winder drum.

This is achieved by focussing a light beam on to the cell so that it can be interrupted by either one of two shutters fixed to the drum. One shutter is so positioned that when the drum is at rest with the cage at the pit bank, the shutter is within 2 in. of the light beam. The other shutter operates for the opposite cage. If the drum moves 2 in. in a direction to lower the cage, the shutter interrupts the light beam which closes the second switch. If, when this happens, the keps have not been withdrawn, the alarm is sounded.

MACHINERY AND EQUIPMENT

Lighting with Sodium Lanterns

Choice of lighting equipment for railway sidings is governed by various considerations, which include the layout of tracks, their location relative to running lines, and whether the sidings are used for storage or the marshalling of wagons. The setting of lighting columns in rows at each side of a grid of tracks has been adopted in the sidings at Calverton Colliery, Nottinghamshire, where there is accommodation in the sidings for wagons required to move an estimated final output from the two shafts of 1,000,000 tons of coal a year.

Illumination of Calverton Colliery sidings

The Calverton sidings are at the end of a branch some seven miles long, and in this installation it was unnecessary to give special attention to directional lighting or to its colour to avoid confusion with main-line signalling, and it was possible to use a normal sodium streetlighting lantern. The General Electric Co. Ltd. supplied some 80 lanterns of this type for the scheme, with Osram 140W. sodium lamps. In the lantern adopted, the lamp is enclosed by a dish of perspex, with refractor plates cemented to its sides for light control. The ends of the dish are roughened to diffuse the light.

The lanterns are mounted 25 ft. above ground level on Stanton 6F reinforced concrete columns. They are accessible by ladder for cleaning and maintenance. Spacing between the columns in each row is 120 ft. for most of the length of the sidings, but they are placed closer together at the entry to each group of tracks so as to provide additional lighting in the points area. The installation was planned in conjunction with officials of the National Coal Board.

Coupled Drill Rods

Among the deep drilling equipments produced for the mining and allied industries are the coupled drill rods manufactured by Rip Bits Ltd. The standard sets of coupled rods comprise the shank end rod at one end of which is a collared or lugged shank to fit into the chuck of the rock drill with the other end screwed externally; the bit end rod with one end screwed externally in similar fashion to the shank end with the other extremity upset and tapped to take the connecting stud of the Rip Bit or Riploy tungsten carbide tipped bit; and the extension rods which are externally screwed at both ends in similar manner to the shank end and bit end.

Couplings are of the internally threaded sleeve type and fit over the threaded ends of the extension rods. The diameter of the couplings is maintained at a minimum to allow for the use of small bits, and couplings range from 1⅛ in. to 1¼ in. in diameter, while shank end, extension and bit end rods are supplied at maximum lengths of 12 in. overall, 60 in. overall and 48 in. overall respectively. Steel sections vary from ⅞ in. Hall. Hex to 1¼ in. Hall. Rnd.

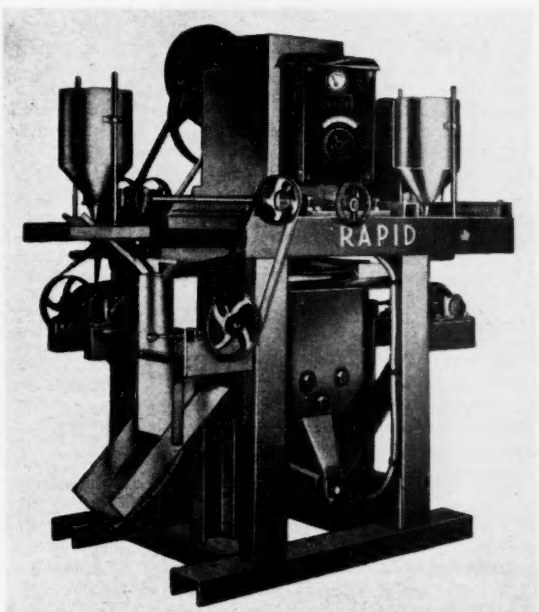
The manufacturers, in a recent pamphlet, suggest that best results will be obtained if the bit diameter is approximately from ¼ in. to ½ in. greater than the diameter of the coupling. With this difference, the couplings tend to act as guides and avoid undue whip in the rods. The main advantages of the Rip Bit coupled equipment are presented as the use of high quality alloy steel which allows couplings of a smaller diameter to be made without any loss of strength at the joint, the smaller couplings allowing the use of smaller bits which in turn avoid the wasted time and effort of drilling an unnecessarily large volume of rock, and the use of tungsten carbide bits which avoids excessive gauge loss and makes it possible to drill the complete hole with one bit.

Magnetic Ore Separators

Feed speed, low current factor and variable intensity are fundamentals in the successful operation of any magnetic ore separator, and it is of interest that variable intensity, considered as an individual entity, implies an uneffected energizing current owing to regulation of the gap existing between ore and magnets. Rapid Magnetic Machines Ltd. have established a wide range of these equipments, of which the Rapid O.G. group will treat up to a maximum of six products of varying permeability at one passing, described in *The Mining Journal* of May 1, 1953.

A unit specially designed for the high speed extraction of a single magnetic product, however, is the Rapidity, a tangential disc separator. The design of this unit ensures that the ore is under the influence of a larger magnetic zone for a longer period, and also that complete polarization and effective separation occurs.

In operation, the sized ore is fed into hoppers in regulated flow which ensures a uniform distribution over the conveyor bands. Magnetics are extracted in the intensified fields by a revolving disc which is magnetized by induction from stationary magnets beneath the bands. This operation embraces the same principle as that employed in the O.G. range. Control of the air gap is by hand wheel.



"Rapidity" type separator for extraction of single feebly magnetic material

The bands pass along the stationary magnet poles in the same direction and slightly slower than the periphery of the revolving metal disc. The relatively stationary ore becomes highly polarized during its passage through the field. The variation in velocity between conveyor band and revolving disc enables the extracted product to be carried ahead of the non-magnetics.

METALS, MINERALS AND ALLOYS

COPPER.—Reports both from Santiago and New York make it clear that Chile has now re-entered the world copper market. The implications of this are considered elsewhere in this issue under "*Notes and Comments.*" Meanwhile, the U.S. domestic price for January deliveries remains fractionally under 30 c., although not unnaturally both the New York and London markets have been showing signs of nervousness and it is difficult to avoid the conclusion that prices must now go lower. However, the re-entry of Chile into the market has been anticipated for so long, as shown by the backwardation of recent months, that it is difficult to imagine that consumers are holding excessive stocks. Indeed, this week's heavy buying in London from the Government broker emphasizes the extent to which consumers are living from hand to mouth.

Some indication of the extent to which U.S. civilian copper demand has surprised the markets this year by its continued firmness is reflected in a recent U.S. Department of Commerce estimate that total copper and brass mill shipments of fabricated products this year will total 2,550,000 s.tons, a gain of 100,000 s.tons over 1952. During the first six months of the year, cutbacks in military demand were more than offset by civilian deliveries, which are stated "to have surged ahead" following the relaxation of controls, although the pressure of civilian demand began to fall off this autumn.

Following on Dr. Eisenhower's report on his South American mission, it is being suggested in Washington that the Government may reconsider the request from A.S. and R. for Government assistance in its Peruvian copper mining project at Toquepala. It is, however, unlikely that anything definite will develop in this direction before the report of the Randall Commission is available. At the time when the new Administration took over, negotiations were on hand for a loan of $120,000,000 while A.S. and R. were proposing to put a further $70,000,000 into the scheme, under which it was estimated that at the end of five years Toquepala could be producing at the rate of 100,000 tons of metal per annum.

Part of the purpose of the new fiscal legislation, which is currently the subject of discussion between the Chilean Government and local subsidiaries of the American copper companies, is to work out more effective incentives for stimulating increased investment and for expanding production. In this connection attention is being paid to proposals for the development of two new copper deposits near Santiago in which Anaconda is interested. Ore reserves have been estimated at 8,000,000 tons, which, it is believed, could yield 30,000 to 40,000 tons of blister copper per annum.

Details have now been released of the new trade agreement which has been signed between Chile and West Germany, which provides for the exchange of goods to the value of $35,000,000 on either side by the end of 1954. Germany's purchases will include metal and ores to the value of $22,000,000, and are believed to include the whole of the output of the Paipote smelter.

The Chilean Copper Mining Committee have also under consideration a revised copper-for-cattle barter agreement with the Argentine. The old agreement provided for Chile supplying 15,800 tons of copper, but there is no indication as yet of the scale of the new agreement.

LEAD AND ZINC.—The U.S. market for both these metals has been quiet this week and seems likely to remain so until the New Year. Lead, in particular, has shown signs of easing with the export price being quoted at 11.25 c., although the zinc export price remains unchanged at 9 c.

The U.S. Foreign Operations Administration has authorized the spending by the U.K. of $5,000,000 worth of aid funds on the purchase of Canadian lead next year. This is taken to be purely a financial arrangement and not to indicate any abnormal shipments from this source.

In this country the outlook for the lead market seems not unpromising at present prices. The motor industry is operating at a high rate and it is clear that the Government is doing everything possible to stimulate building, as indeed is the case in Germany. Although lead suffers to-day increasingly from the competition of substitutes in the building industries this market is still a substantial one.

TIN.—Second thoughts on last week's communiques from Geneva appear to have had no marked effect on tin prices, the spot price in particular finishing pretty steady on the week.

Meanwhile, with tin restriction not yet an established fact, Bolivian exports show signs of being considerably up on last year's figures. Exports for the first nine months of this year are reported at 27,288 tons compared with 25,517 tons in the corresponding period of 1952. With shipments last November and December being some 3,000 tons below the average for these months in recent years, due to the temporarily retarding influence of nationalization, total exports this year may well be some 5,000 tons above last year's figure.

A Reuter dispatch from Djakarta foreshadows the conclusion of a trade agreement between Indonesia and China which will provide *inter alia* for the shipment of tin to China.

ALUMINIUM.—Whatever may be happening elsewhere in the metal markets, aluminium markets seem to continue, like Messrs. Rogers and Hammerstein's springtime, to be "busting out all over." Last week the *Wall Street Journal* carried the report that aluminium products in the U.S. building industry have increased 38 per cent this year over 1952. In terms of tonnage consumed, building products are expected to take 280,000 s.tons of aluminium this year compared with 202,000 s.tons in 1952. Even more striking is the forecast that 1954 will see consumption up to more than 375,000 s.tons—getting on for double the 1952 figure. As examples of aluminium's rate of growth in an industry which traditionally uses other materials, the report mentions that whereas 5 per cent of all window frames (metal and wood together) were made of aluminium in 1949 the proportion had advanced to 20 per cent by 1953, while the use of aluminium nails, although a small item in itself, has over the past 8 years grown to 20 times the 1945 figure and in 1953 accounted for 2,000 tons of aluminium.

ANTIMONY.—Russia, and possibly Finland, are believed to have been offering considerable quantities of antimony in the open market recently. Offers of 99 per cent metal have also been reported from Shanghai and Hong Kong; so far these offers appear to have been on the basis of the United Kingdom domestic price which remains some £30/40 above the Continental price.

NICKEL.—It now appears that the nickel expansion goal, announced recently by the O.D.M. in Washington as being 80 per cent completed, has been fixed at 190,000 tons per annum. It is also clear from recent Washington reports that the term "80 per cent completed" refers only to the planning stage. It is expected that 152,000 tons of this planned increase in annual production will be available by 1956 of which about 57,000 tons will come from G.S.A. assisted production, the remainder coming from "unassisted" production. The balance of the programme's increase is expected to be made up chiefly by expansion of production at Nicaro and through the Freeport Sulphur Company's recently announced plans for increased output at Moa Bay in Cuba.

TUNGSTEN.—Although little, if any, business has been done in London this week consumers are reported to be displaying a little more interest and it is thought that in some cases stocks may be running low. The trend of the world buying price meanwhile continues downwards, foreign ore being quoted in New York c.i.f. U.S. ports at $25/26 nominal per s.ton, against $28 a week ago, exclusive of import duty equivalent to about another $8. London quotations for both scheelite and wolfram are also down.

DIAMONDS.—A new company has been registered in Amsterdam for the purpose of buying, processing and selling diamonds. The name of the company is the Diamantbewerkers Association N.V. and it is understood that a large, if not controlling, shareholding in the organization is held by Algemene Nederlandse Diamantbewerkersbond.

SILVER.—It has been announced this week that British Government silver stocks will not in future be made available to satisfy essential requirements of U.K. industries, nor will any official sales prices be quoted. U.K. consumption of silver

for essential purposes is around 10,000,000 oz. per annum. Silver dealers are now to be permitted to purchase enough silver to meet these trade requirements in the cheapest markets abroad, making, if necessary, purchases in the dollar area. In other respects import and export operations in silver are to continue under the same licensing regulations as in the past.

The effect of this week's announcement has been to cause a rise in the London silver price which is now quoted at 73⅞d. per oz., an increase of ⅛d. over last week.

Iron and Steel

Inevitably the outlook for the iron and steel industry was recently completely overshadowed by the threat of a Christmas rail strike. The crippling effects of a stoppage would have extended to all branches of industry, and would have been especially severe in the iron and steel industry which is the biggest user of rail transport.

It was understood that should a peaceful settlement mature, most of the iron and steel works would forego their Christmas holiday. It is the intention to maintain the blast furnaces, coke ovens, and steel furnaces in full production throughout the festive season, only the rolling mills being laid idle for the week-end.

There still remain substantial balances of uncompleted orders and every effort is being made to clear these from the books before the end of the year. Bookings for the first quarter of 1954 are also extensive although the fact that deliveries can now be promised over much shorter periods, suggests that the supply of steel has overtaken the demand to a very great extent.

There are, of course, a few exceptions. Distribution of steel plates has improved but is not yet on a scale sufficient to ensure full satisfaction of all requirements. The boom in the sheet trade is also taxing the capacity of the mills to its highest limits. There has been a welcome recovery in the tin plate trade and rail mills will begin the New Year with very heavy commitments both for the home railways and for export.

On the other hand the deliveries of joints, sections, rounds, squares and flats have recently exceeded the volume of replacement orders and there has been a marked softening of the export markets of which the recent cuts in export prices is a clear indication. The price factor continues to exclude British re-rolled products from European markets and home business is insufficient to afford full employment for the mills.

British steel makers are now able to provide ample tonnages of billets, blooms, slabs and sheet bars. Apart from the shrinkage of imports which this has entailed, one of the consequences has been that difficulty has recently been experienced in the disposal of defective material. As an inducement to re-rollers to take up their supplies, the home price of defective blooms and slabs has been reduced by £2 per ton.

The London Metal Market

(From Our Metal Exchange Correspondent)

The tin market, following the termination of the Geneva Conference, has been fairly steady, not being influenced especially either one way or the other. Although it is realized that American approval, or otherwise, of the suggestions of the Conference will have a considerable bearing on the future of the market, prices tended to weaken in London until another consideration crept in. This was a rumour that a strike was imminent or had commenced at one of the Malayan smelters, and that as a consequence shipments from there might be curtailed. This rumour, together with active bidding by dealers closely connected with the Straits market, sufficed to advance prices and to increase the backwardation to about £30 per ton. On Thursday morning the Eastern price was equivalent to £658¼ per ton c.i.f. Europe.

There is no very definite news as to the Chilean negotiations for the sale of their accumulated surplus copper stocks or current production, but it is understood that revision of exchange rates and taxes applicable to American-owned producers in Chile is under active consideration. In the meantime the market here, although having declined, looks steady at the lower levels. There has been a good demand during the week for Government supplies of special brands or shapes not at present available from ordinary market sources.

There has been a steady demand for lead, especially for prompt delivery, although with the approach of the end of the year metal for early arrival is not finding such a ready outlet as recently. Continental demand also seems to have tailed off during the last week, probably also owing to end of year influences. Consumption of lead in this country has been well maintained and shows an appreciable increase for the first ten months over the same period of 1952.

Zincs continues in fairly good demand here, and on the Continent prices rule rather above the London market. Supplies of prompt metal are none too plentiful in Europe, but in America producers have been curtailing the output of slab metal although stocks there still seem to be increasing. The market here and on the Continent displays a very good undertone.

Closing prices and turnovers for the week are given in the following table:—

	December 10		December 17	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Tin				
Cash	£655	£660	£655	£657½
Three months	£640	£642½	£635	£637½
Settlement	£657½		£655	
Week's turnover	785 tons		480 tons	
Lead				
Current month	£90¼	£90⅜	£90¼	£90⅜
Three months	£88½	£88⅝	£88¼	£88⅜
Week's turnover	5,225 tons		3,825 tons	
Zinc				
Current month	£74⅛	£74¼	£74⅜	£75
Three months	£74	£74⅛	£74⅛	£74⅜
Week's turnover	4,000 tons		3,400 tons	
Copper				
Cash	£234½	£235	£238	£229
Three months	£224½	£224½	£218½	£219
Settlement	£235		£229	
Week's turnover	4,650 tons		5,225 tons	

OTHER LONDON PRICES — DECEMBER 17

ANTIMONY

English (99%) delivered, 10 cwt. and over .. .. £210 per ton
Crude (70%) .. .. .. £200 per ton
Ore (60% basis) .. .. .. 22s./24s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade) .. .. £483 per ton

OTHER METALS

Aluminium, 99·5% £150 per ton
Bismuth (min. 4 cwt. lots) 16s. lb.
Cadmium (Empire), 13s. 10d./14s. 4d. lb.
Chromium, 6s. 5d./7s. 6d. lb.
Cobalt, 20s. lb.
Gold, 248s. f.oz.
Iridium, £60 oz. nom.
Magnesium, 2s. 10½d. lb.
Manganese Metal (96%-98%) £225/£262
Osmiridium, £40 oz. nom.
Osmium, £65/£70 oz. nom.
Palladium, £7 15s./£8 10s. oz.
Platinum, £27/£33 5s.
Rhodium, £42 10s. oz.
Ruthenium, £25 oz.
Quicksilver, £61 15s. ex-warehouse
Selenium, 30s. 6d. nom. per lb.
Silver 73⅞d. f.oz. spot and f'd.
Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth .. .. 65% 8s. 6d. lb. c.i.f.
60% 8s. 3d. lb. c.i.f.
Chrome Ore—
Rhodesian Metallurgical (lumpy) £14 8s. 0d. per ton c.i.f.
,, ,, (concentrates) £14 8s. 0d. per ton c.i.f.
,, ,, Refractory £14 0s. 0d. per ton c.i.f.
Baluchistan Metallurgical .. £15 19s. 6d. per ton c.i.f.
Magnesite, ground calcined .. £26 - £27 d/d
Magnesite, Raw .. .. .. £10 - £11 d/d
Molybdenite (85% basis) .. 102s. 4d. - 103s. per unit c.i.f.
Wolfram (65%) .. .. .. World buying 160s.-170s.
,, ,, ... 195s. nom. U.K. Selling
Scheelite .. .. World buying 155s.-165s.
,, ... 180s. nom. U.K. Selling
Tungsten Metal Powder (98% Min. W.) .. .. 16s. 6d. nom. per lb. (home)
Ferro-tungsten .. .. .. 13s. 6d. nom. per lb. (home)
Carbide, 4-cwt. lots .. .. £35 13s. 9d. d/d per ton
Ferro-manganese, home .. .. £52 10s. 0d. per ton
Manganese Ore Indian c.i.f. Europe (46% - 48%) .. .. .. 7s. 11d. - 8s. 4d. per unit
Brass Wire .. .. 2s. 5¾d. per lb. basis
Brass Tubes, solid drawn .. 1s. 10d. per lb. basis

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Stock markets are now well launched in the account covering Christmas and the New Year. This is traditionally a quiet time but business has been reasonably well maintained. The threatened railway strike affected the gilt-edged market and falls occurred in all the active stocks. Later hopes of settlement brought a recovery. The large payout of coal compensation stock had a restraining effect on the market but it seems probable that this can be to some extent countered by purchases resulting from the sale of steel and transport to the general public.

Among mining shares, Kaffirs were the chief attraction. One of the main features was the speech by Mr. Annan, the chairman of Consolidated Goldfields.

Market gossip during the week centred around the Union's future position as one of the main uranium producers in the world and its possible effect on American policy. Many of the December dividends declared were much better than expected and there has been optimism in London and Johannesburg over the December quarterly reports.

With regard to share prices, Johnnies New were changing hands fairly steadily at around 4s. premium. Consolidated Goldfields, Union Corporation and West Witwatersrand line shares were all higher. Among individual mines, those affected by dividend increases rose sharply and outshone uranium producers which, nevertheless, were well patronized. West Driefontein picked up after initial selling. It is thought that this may have been occasioned by switching into other "lighter" issues. Western Reefs encountered some profit-taking after their recent rise but met steady investment support at the lower level.

Orange Free State shares were active, helped by the broadening trend of the market. Most of the popular issues received steady support but the Freddies group were again neglected. Outstanding in this section, Free State Geduld jumped on unconfirmed rumours of very high development values on the reef. The two President mines rose for similar reasons with Ofsits also higher in sympathy. It is probable that investors will have to await the quarterly reports before any definite news can be obtained.

Miscellaneous gold shares were rather quiet but the Cam and Motor improved following the chairman's excellent review. Plans have been made for the development of the mine to meet its enhanced potentialities.

Coppers lacked interest and fell away following the lead of the metal price. The decision to sell Chilean stocks on the open market had a rather dampening effect. Interest was mainly confined to Bancroft shares which touched a new peak of 8s. 3d. Rhodesian Katangas also improved sharply in later dealings (not shown below). This was brought on by speculative buying and development rumours.

Eastern tin shares were rather mixed but the reduced interim distributions by Malayan Dredging and South Malayan were not as bad as expected in some quarters and the shares recovered. Nigerians were the turn lower but Gold and Base Metal remained unchanged on the news that the agreement with the United States for an advance up to £100,000 to develop the Rishi columbite area has been signed.

Lead/zinc shares were dull. The slight upward adjustment in the London silver price is not likely to have any noticeable effect on profits. Lake George again fell away on the disappointing report. This mine is now a high cost marginal producer and the current metal price is clearly too low for it.

Associated Manganese fell sharply after the dividend declaration of 170 per cent against 130 per cent despite the fact that this now puts the shares on an 18 per cent yield basis. The Consolidated Murchison dividend, though better than expected at 60 per cent against 140 per cent, was not good enough for the optimists and the stock fell. On the other side of the picture, Turner and Newall jumped on the sharp increase in distribution by this conservatively managed concern.

	Price Dec. 16	+ or — on week
FINANCE		
African & European	2 3/32	+ 1/32
Anglo American Corpn.	5 1/4	+ 3/8
Anglo-French	16/9	—3d
Anglo Transvaal Consol.	20/-	.....
Central Mining (£1 shrs.)	28/6	+3d
Consolidated Goldfields	49/3	+6d
Consol. Mines Selection	28/1 1/2	+1/3
East Rand Consols	3/1 1/2	+1 1/2d
General Mining	3 1/2	+ 1/4
H.E. Prop	38/1 1/2	+1/3
Henderson's Transvaal	7/4 1/2	—1 1/2d
Johnnies	43/9XR	—1/3
Rand Mines	3 3/8	+ 1/16
Rand Selection	30/-	+7 1/2d
Strathmore Consol.	32/6	.....
Union Corp. (2/6 units)	28/3	+1/6
Vereeniging Estates	3 1/16	.....
Writs	32/6	+6d
West Wits	42/3	+4 1/2d
RAND GOLD		
Blyvoors	35/9	+1/-
Brakpan	9/-	+3d
City Deep	16/3	+1/3
Consol. Main Reef	16/10 1/2	+1/10 1/2
Crown	35/7 1/2	+3/1 1/2
Daggas	3 5/32	.....
Doornfontein	26/-	+6d
Durban Deep	34/4 1/2	+1/10 1/2
E. Daggas	14/-	+1/-
E. Geduld .. (4/- units)	26/10 1/2	.....
E. Rand Props	2 1/8	+ 1/16
Geduld	3 1/8	— 1/16
Govt. Areas	11/6	+3d
Grootvlei	20/6	+9d
Libanon	9/4 1/2	+1 1/2d
Luipaards Vlei	22/9	+6d
Marievale	19/3	+1/-
Modderfontein East	15/-	.....
New Kleinfontein	16/3	.....
New Pioneer	17/6	+3d
Randfontein	58/6	+1/6
Robinson Deep	11/-	+6d
Rose Deep	13/1 1/2	.....
Simmer & Jack	4/7 1/2	+1 1/2d
S.A. Lands	21/3	+1/9
Springs	4/6	+4 1/2d
Stilfontein	27/1 1/4	+10 1/2d
Sub Nigel	40/-	+7 1/2d
Van Dyk	5/-	.....
Venterspost	14/3	.....
Vlakfontein	13/3	+6d
Vogelstruisbult	35/6	+6d
West Driefontein	6 7/32	+ 1/4
W. Rand Consolidated	2 13/32	+ 1/16
Western Reefs	2 3/16	— 1/32
O.F.S.		
Freddies	9/-	.....
Freddies N.	8/7 1/2	.....
Freddies S.	8/3	.....
F. S. Geduld	2 1/8	+ 1/8
Geoffries	14/-	+3d
Harmony	25/9	+3d
Loraine	8/-	.....
Lydenburg Estates	12/-	+6d
Merriespruit	8/6	+3d
Middle Wits	14/-	+6d
Ofsits	37/9	+2/9
President Brand	30/6	+1/10 1/2
President Steyn	22/1 1/2	+1/7 1/2
St. Helena	16/1 1/2	+1 1/2d
Virginia Ord.	11/7 1/2	+4 1/2d
Welkom	18/-	+1/6
Western Holdings	3 1/16	+ 1/16
WEST AFRICAN GOLD		
Amalgamated Banket	1/7 1/2	.....
Ariston	5/7 1/2	—1 1/2d
Ashanti	19/10 1/2	.....
Bibiani	5/-	.....
Bremang	2/1 1/2	.....
G.C. Main Reef	3/3	.....
G.C. Selection Trust	6/3	.....
Konongo	2/3	.....
Lyndhurst Deep	1/-	.....
Marlu	1/6	.....
Taquah & Abosso	2/3	—3d
AUSTRALIAN GOLD		
Boulder Perseverance	2/7 1/2	+1 1/2d
Gold Mines of Kalgoorlie	13/6	.....
Great Boulder Prop.	8/3	+1 1/2d
Lake View and Star	13/9	—3d
Mount Morgan	17/-	—4 1/2d
North Kalgurli	6/4 1/2	+1 1/2d
Sons of Gwalia	5/6	.....
South Kalgurli	6/6	.....
Western Mining	11/3	.....
MISCELLANEOUS GOLD		
Cam and Motor	9/6	+1 1/2d
Champion Reef	4/3	—3d
Falcon Mines	7/-	.....
Globe & Phoenix	21/9	.....
G.F. Rhodesian	5/4 1/2	+4 1/2d
London & Rhodesian	4/9	+1 1/2d
Motapa	1/10 1/2	.....
Mysore	4/1 1/4	+1 1/2d
Nundydroog	5/7 1/2	+1 1/2d
Ooregum	3/-	—1 1/2d
Oroville	12/9	+1/-
MISCELLANEOUS GOLD (contd.)		
St. John d'El Rey	22/-	—6d
Zams	31/3	.....
DIAMONDS & PLATINUM		
Anglo American Inv.	4 3/16	— 1/32
Casts	21/6	+3d
Cons. Diam. of S.W.A.	4 1/2	.....
De Beers Defd. Bearer	68/3	.....
De Beers Pfd. Bearer	16 1/2	+ 1/8
Pots Platinum	7/10 1/2	—1 1/2d
Watervaal	12/9	—3d
COPPER		
Chartered	52/9	.....
Esperanza	7/-	—4 1/2d
Indian Copper	4/-	.....
Messina	3 1/2	+ 1/32
Nchanga	6 3/8	— 1/32
Rhod. Anglo-American	47/6	—1/-
Rhod. Katanga	13/9	—3d
Rhodesian Selection	13/6	—4 1/2d
Rhokana	17 1/2	— 1/4
Rio Tinto	19 1/2	— 1/4
Roan Antelope	13/6	.....
Selection Trust	32/6XD	—1/3
Tanks	58/-XD	—6d
Tharsis Sulphur Br.	43/1 1/2	+7 1/2d
TIN (Eastern)		
Ayer Hitam	24/-XD	+6d
Bangrin	8/-	.....
Gopeng	8/-	.....
Hongkong	6/6	.....
Ipoh	15/-	.....
Kamunting	9/-	+3d
Kepong Dredging	4/3	.....
Kinta Tin Mines	10/3	—1 1/2d
Malayan Dredging	26/3	+6d
Pahang	12/3	.....
Pengkalen	8/-	.....
Petaling	8/-	—3d
Rambutan	12/-	+1/-
Siamese Tin	8/-	.....
Southern Kinta	13/-XD	+4 1/2d
S. Malayan	24/4 1/2	+7 1/2d
S. Tronoh	7/3	—1 1/2d
Sungei Kinta	10/-	.....
Tekka Taiping	5/3	+7 1/2d
Tronoh	23/3	+1/-
TIN (Nigerian and Miscellaneous)		
Amalgamated Tin	11/6	—1 1/2d
Beralt Tin	20/-	+6d
Bisichi	4/6	—1 1/2d
British Tin Inv.	12/-	—9d
Ex-Lands Nigeria	3/6	.....
TIN (Nigerian and Miscellaneous) contd.		
Geevor Tin	9/9	.....
Gold & Base Metal	3/-	.....
Jantar Nigeria	7/9XD	—6d
Jos Tin Area	12/3	—3d
Kaduna Prospectors	2/4 1/2	—1 1/2d
Kaduna Syndicate	2/3	—3d
London Tin	5/1 1/2	—1 1/2d
United Tin	3/3	.....
SILVER, LEAD, ZINC		
Broken Hill South	42/6	.....
Burma Mines	1/9	.....
Consol. Zinc	24/6	—1/3
Lake George	6/9	—7 1/2d
Mount Isa	30/6	—3d
New Broken Hill	22/6	.....
North Broken Hill	2 1/8	+ 1/32
Rhodesian Broken Hill	10/6	—3d
San Francisco Mines	17/6	+3d
Uruwira	2/6	.....
MISCELLANEOUS BASE METALS & COAL		
Amal. Collieries of S.A.	43/-	+6d
Associated Manganese	48/-	—5/3
Cape Asbestos	22/7 1/2	—4 1/2d
C.P. Manganese	52/6	.....
Consol. Murchison	25/-	—1/3
Mashaba	3d	.....
Natal Navigation	2 1/16	.....
Rhod. Monteleo	1/3	.....
Turner & Newall	68/9	+4/3
Wankie	13/-	+3d
Witbank Colliery	3 1/16	.....
CANADIAN MINES		
Dome	$28 1/4	.....
Hollinger	$22 3/4	— 1/4
Hudson Bay Mining	$73	—2 1/4
International Nickel	$64	—3 1/4
Mining Corpn. of Canada	£4	+ 1/4
Noranda	$115	—2
Quemont	£5 1/8	+ 1/2
Yukon	3/9	.....
OIL		
Anglo-Iranian	8 7/16	+ 1/4
Apex	47/6	+2/6
Attock	34/4 1/2	.....
Burmah	57/6	+1/3
Canadian Eagle	28/1 1/2	—4 1/2d
Mexican Eagle	22/4 1/2	.....
Shell (bearer)	98/9	.....
Trinidad Leasehold	34/9	+6d
T.P.D.	22/3	.....
Ultramar	28/7 1/2	—9d

COMPANY NEWS AND VIEWS

Rand Dividend Season Opens

Generally satisfactory has been the market verdict on the dividend payments so far declared by the South African gold mining companies.

The first of the big groups to declare their December dividends was the Anglo American Corporation of South Africa whose payments were referred to by our stock exchange correspondent in last week's issue. Four of the six companies in the Anglo American group repeated last June's distributions, but East Daggafontein and South African Land and Exploration raised their distributions by a 1½d. and 3d. respectively.

The dividends declared by the Central Mining-Rand Mines group were fully up to market anticipation, eight of the companies maintained their payments at previous rates, but two companies in the group, Crown Mines and Transvaal Gold, increased their payments by 6d. and 3d. respectively.

In the Union Corporation group, Marievale Consolidated raised its dividend from 10d. to 11d. per share, though Grootvlei lowered its distribution by a 1d. to 1s. 1d. per share. Rand Leases, in the Anglo Transvaal Consolidated group, also paid less, this time 3d. against 4½d. in June. West Rand Consolidated, however, whose revenue has been swelled from uranium earnings, is paying 2s. against 1s. 9d. last June and 1s. 6d. a year ago.

Company	*June* (1952)	*Dec.* (1952)	*June* (1953)	*Dec.* (1953)
Anglo American	*s. d.*	*s. d.*	*s. d.*	*s. d.*
Brakpan	7½	9	6	6
Dagga	3 0	3 0	3 0	3 0
E. Dagga	1 1½	1 0	9	10½
S.A. Land	1 9	1 9	1 3	1 6
Springs	3	3	1½	1½
W. Reefs	1 3	1 3	1 3	1 3
Central Mining				
Blyvoor	1 6	1 6	1 4	1 4
City Deep	1 6	1 0	6	6
Con. Main Reef	2 9	2 3	1 9	1 9
Crown	2 6	2 6	2 6	3 0
Durban Deep	2 6	2 0	1 9	1 9
E. Rand Prop.	2 6	2 6	1 9	1 9
Modder East	2 0	1 6	1 6	1 6
Rose Deep	1 9	1 3	nil	nil
Rand Mines	3 0	3 0	3 0	3 0
Trans. Gold	9	9	6	9
Union Corporation				
E. Geduld	2 0	2 1	1 9	1 9
Geduld	6 3	6 3	5 9	5 9
Grootvlei	1 3	1 3	1 2	1 1
Marievale	10	10	10	11
General Mining				
S. Roodepoort	9	9	9	9
W. Rand Consol.	1 6	1 6	1 9	2 0
Anglo-Transvaal				
Rand Leases	1 4½	1 0	4½	3

Wankie 1954: A Year of Great Achievement

Mr. T. Coulter, chairman of Wankie Colliery, brought shareholders up-to-date on the company's position in his speech made at the annual meeting held in Bulawayo at the beginning of this week.

With regard to the general situation at the Colliery, he stressed once again the immense amount of work which lies ahead in re-organizing and expanding production to reach Wankie's target output. Currently, the problem was to effect a number of changes involving production techniques without loss of output. But good progress has been made in this direction due to the company's ability to find the personnel having the experience necessary for their successful establishment.

Progress at the No. 3 colliery had been satisfactory and although output would be somewhat restricted, he said, owing to the lack of adequate hoisting facilities, after May, 1954, production should rise rapidly to 50,000-55,000 tons per month. However, when the permanant preparation plant comes into commission about the end of 1954, the underground development position should be sufficiently advanced to produce a substantial and immediate increase in output.

Concluding his remarks, Mr. Coulter said that with No. 3 colliery coming into production at an early date and with improved methods of production at the two existing collieries, there was much justification for feeling that 1954 would be a year in which much should be achieved.

Lampa Mining Produces More and Pays More

Lampa Mining, the Peruvian silver and copper producer, is paying 15 per cent in respect of the year ended June 30 last, which compares with 12½ per cent per £1 share on its issued capital of only £70,000.

From the table immediately below it will be seen that while the matte output increased, the copper and silver content per ton showed a decline, so that the company was not able to reap the full advantages of the higher throughput. In this connection, it should be noted that the decline in the assay content of the matte, in fact, relates to the grade of silver in the ore as the copper grade is fairly constant. In any event, the percentage recovery of both copper and silver improved by about 1 per cent and although the cost per ton of matte at the port of shipment increased by over 7 per cent, the actual value realized by the company per ton of matte increased to a slightly greater extent and as a result there was a small improvement in the realized surplus per ton.

Year to June 30	*Matte Output* (*tons*)	*Assay per ton* *Copper* %	*Silver* (*oz.*)	*Yield* *Copper* (*tons*)	*Silver* (*oz.*)	*Recovery %* *Copper*	*Silver*
1953	1,055	28.1	245.1	297	258,637	83.6	86.6
1952	968	29.8	258.4	289	250,289	82.6	85.7

The net favourable effect was reflected in higher ore proceeds which, despite a reduction in the figure after providing for higher mining costs and taxation liabilities, gave a net profit figure of over £2,000 higher than in the preceding year. Thus, the company was able to raise its dividends by 2½ per cent to 15 per cent, allocate £14,000 (nil) to general reserves, provide £1,000 (same) for its contingencies account, with only a slight reduction in the forward balance.

Year to June 30	*Ore Proceeds* £	*Mining Costs* £	*Taxation* £	*Net Profit* £	*Dividend* %	*Carry Forward* £
1953	136,157	81,218	30,066	10,530	15	8,390
1952	113,923	64,434	27,325	8,166	12½	9,385

Currently the company is trying to regularize the production of matte by working two smelters simultaneously during each alternate month which will cut the furnace relining costs as well as improving the overall production figures. Furthermore, the company is still engaged in bringing into operation its new segregation plant which will enable lower grade ores to be treated with profit. Both these projects bode favourably for the company as does the fact that during the current year E.P.L. will apply to only six months.

Indeed, these favourable features should work to the company's advantage when it obtains a quotation for its shares on the London Stock Exchange, in anticipation of which an extraordinary general meeting is being convened after the annual meeting to approve a special resolution to convert the company's £1 share units into stock units and to make them transferable in 1s. units.

Mr. J. Shirley Esplen is chairman. Meeting, Liverpool, December 17.

Tronoh Mines Oppose Tin Control Agreement

Mr. J. H. Rich, chairman of Tronoh Mines, in his address to shareholders said that providing there is no serious falling off in American productivity he believed that the existing period of low tin prices could be regarded as a passing phase. In support of this belief he added that tin production had reached its peak and would now tend to fall—unless, of course, new tin fields were discovered—while statistics showed that the general trend of consumption was upwards.

Commenting on the proposed International Tin Control Agreement, Mr. Rich criticized the scheme on the historical basis that the pre-war Control Scheme failed to produce any stability of either production or price and illustrated his point by reviewing the price fluctuations during the ten years in which the pre-war Control Scheme operated.

Since the report and accounts of Tronoh Mines deal with

the company's operations during the calendar year 1952 and thus give no indication as to how the company will fare in 1953 faced as it will be by the catastrophic drop in the tin price since March last. Mr. Rich's remarks on the future prospects of the mine are very much to the point. On this question he said that output for the current year will not be less than that of the year under review, and, in fact, it may be slightly more though the big drop in the tin price will be reflected in the resulting profit. Results for the first nine months of the current year confirm his forecast as the total of tin concentrates produced by the end of September last was 1,487 tons, compared with 1,431 tons in the corresponding period of the year under review.

Even though the report and accounts covering the company's operations during the calendar year 1952 have to be considered without reference to the recent decline in the tin price, it is perfectly clear from the table below, summarizing the salients of the profits and loss account, that 1952 was a prosperous year for the company.

Year to Dec. 31	*Ore Sales**	*Mining Costs*	*Taxation*	*Net Profit*	*Dividend*	*Carry Forward*
	£	£	£	£	*s. d.*	£
1952	1,003,606	462,496	421,293	303,780	6 6	296,334
1951	923,648	377,781	416,208	327,173	5 9	288,429

* Net sale price

Its fleet of four dredges recovered 1,713 tons of tin concentrates, an increase of 253 tons over the preceding year—a real achievement when account is taken of the fact that two of the dredges were not working for the full year. On the other hand, the average price realized by the sale of 1,678 tons of tin concentrates showed a decrease of £63 per ton to £587 per ton and dredging costs—excluding the cost of replating the pontoons of two of its dredges—advanced from 14.8d. per cu. yd. to 15.8d. per cu. yd.

Tronoh Mines is one of the few operating tin producers whose investment income forms an appreciable percentage of its total income and despite the disappointing results experienced by Harrietville (Tronoh), the company's gross dividend income reached the substantial figure of £130,525 compared with £124,530. This item, together with ore proceeds of £1,003,606 and income from tribute and sundry revenue of £79,420 (£78,299), made up the company's total income for the year of £1,213,614, compared with £1,130,893. The higher offtake in taxation, however, and the increase in mining costs, were the two main factors responsible for the net profit being slightly lower than in 1951. Yet this did not prevent the company from increasing its total distribution to 6s. 6d. per 5s. share on the £300,000 issued capital which absorbed a net amount of £205,875. Incidentally, the total distribution is equivalent to approximately 21¼ per cent of the capital invested in the business, including profits ploughed back. The sum of £90,000 (nil) was transferred to the reserve account raising that fund to £490,811. The carry forward at the end of 1952 was almost equal to the company's issued capital and at £296,334 compared with £288,429 brought in. Meeting, London, December 18.

Southern Tronoh's Big Profit Contraction

Southern Tronoh Tin Dredging's operating results for the calendar year 1952 do not stand comparison with those achieved in either of the two preceding years. Tin production dropped from 778 tons to 635 tons reflecting the lower value of the ground worked from 0.53 lb. to 0.44 lb. per cu. yd. while the price realized per ton was down by approximately £64 per ton compared with the preceding year.

Year to Dec. 31	*Ore Sales*	*Mining Costs*	*Taxation*	*Net Profit*	*Dividend*	*Carry Forward*
	£	£	£	£	*s. d.*	£
1952	372,649	207,523	105,617	53,936	2 6	91,791
1951	506,462	168,017	216,230	118,420	5 0	90,355

The current year's outlook is not good. The average price per ton tin ore will be below that received during the year under review and with the company's No. 1 dredge being out of commission for the first nine months, at the end of which time total production was only 121 tons as against 454 tons in the corresponding period of the year under review, all signs point to shareholders having to look to 1954 before a reversal of the present trend is likely to eventuate.

Kepong's Lower Dredging Costs

Kepong Dredging during the year to June 30 last increased its dredge throughput and as the value of the ground treated was only slightly below that of the previous year, the production of tin concentrates rose by 55 tons to 372 tons. Dredging costs per cu. yd. were a feature of the accounts and these dropped from 3s. 3d. per cu. yd. to 2s. 10d. per cu. yd. in spite of the fact that total costs rose by approximately 8 per cent.

Year to June 30	*Ore Sales**	*Mining Costs*	*Taxation*	*Net Profit*	*Dividend*	*Carry Forward*
	£	£	£	£	*s. d.*	£
1953	179,870	122,680	39,136	23,656	1 0	21,035
1952	170,678	113,969	41,276	19,073	1 3	21,891

* Net sale price

Mr. John Herbert Rich, in his statement to shareholders, states that the results of the current year are expected to fall appreciably short of those attained during the year under review when the company had the benefit of working a patch of high grade ground now exhausted. The greatly reduced metal price will also materially affect the results. But, he added, the Tronoh Malayan group is commencing a prospecting programme and the company, in view of its comparatively limited life, will receive high priority should the prospecting meet with any success. Meeting, London, December 18.

Ayer Hitam Tin Dredging's Strong Financial Position

Ayer Hitam Tin Dredging's report and accounts for the year ended June 30 last were briefly dealt with in these columns last week, while a longer notice appeared in our issue of December 4, based on the company's preliminary profit statement. Thus it only remains to note the balance sheet, which shows that the company is in sound financial health. Current assets, including investments, totalled £1,442,640 (£1,232,896) and current liabilities amounted to £605,001 (£364,511), which figure included provision of £508,557 (£283,418) for current taxation, including income tax, for 1953/54. Net current assets, therefore, amounted to £836,639 (£868,385) which compares with an issued capital of £180,000. Mr. G. W. Simms is chairman. Meeting, London, December 30.

Some Tronoh-Malayan Tin Group Results

The profit and loss accounts of Malayan Tin Dredging, Southern Malayan Tin Dredging, and Sungei Besi Mines were briefly dealt with in last week's issue. The following information has been taken from their published reports and accounts and the monthly and quarterly production returns issued by the companies and is given to supplement the notes which appeared in last week's issue.

The general manager, in his report accompanying the accounts of Malayan Tin Dredging for the year ended June 30 last, said that the Malayan Government had been asked to help in investigating improved methods to treat the extreme fineness of the ore in the Kampong Gajah Section, but owing to shortage of staff this work had not yet commenced. Concerning the Kinta River deviation in the same section, he said that the whole deviation was expected to be completed during the current financial year. During the first three months of the current financial year the company produced 648 tons, compared with 602 tons in the corresponding period a year ago.

Southern Malayan Tin Dredging during the year ended June 30 last, produced 3,029 tons tin concentrates, compared with 2,816 in the preceding year. In the first three months of the current year production has been maintained and the 651½ tons produced represents only a very small decline on the 658½ tons produced in the corresponding period of the year ended June 30 last.

The general manager reports that the company now holds prospecting permits over two adjoining areas of State land in the Chenderiang Valley, one of 350 acres, the other of 50 acres; and hopes that permission will be granted to bore these areas during 1954—the question of security having prevented this being done previously.

Sungei Besi Mines, which produced 1,144 tons tin concentrates during the year ended March 31 last, compared with 1,095 tons in the preceding year, appears to be well on its way in the current year to improving on these production totals. In the first six months of the current year the output of tin concentrates amounted to 536 tons compared with 470 tons during the corresponding period in the preceding year.

Common to these three reports, was the favourable comment on the labour supply which the companies found to be more stable than in previous years as well as more plentiful. This is due, no doubt, to the fact that the security position has shown a marked improvement following the Government's resettlement programme and the strict enforcement of food control.

CONSOLIDATED GOLD FIELDS OF SOUTH AFRICA

RECORD PRODUCTION

The annual general meeting of the Consolidated Gold Fields of South Africa Ltd. was held on December 10 in London.

Mr. Robert Annan, Chairman, in the course of his speech, said: In the accounts of the operating company, the working profit for the year amounted to £1,511,000. Although, as we anticipated, the increased profit earned last year from the realization of investments and sundry revenue which included the sale of our interest in Southern European Metal Corporation Ltd. was not maintained, nevertheless, the profit from these sources of £479,000 is satisfactory having regard to the adverse market conditions which prevailed throughout the year.

Dividends and interests on our investments at £1,226,000 constitute a further record and continue to reflect the satisfactory development of our important interests in the mines on the Far West Rand and in the production of platinum.

After charging £635,000 for overseas and United Kingdom taxation the net profit for the year is £876,000. With the single exception of last year this constitutes our highest net profit since 1939.

An analysis of our holdings in gold mines in the Transvaal and the Orange Free State shows that 67.8 per cent of the investment at cost or 87.0 per cent of its value at Stock Exchange prices on June 30 last was in mines capable of producing gold at less than 150s. per ounce.

Coming now to the operations of our own group, the mines achieved record figures for tonnage milled and gold produced with a substantial increase in profits. This is principally due to the expansion of operations at West Driefontein. In the last few weeks Doornfontein has also been added to the list of producers.

West Witwatersrand Areas has come of age and has just issued its twenty-first annual report. In spite of the delays occasioned by the war, the mines on the West Wits line have already produced gold to the value of over £100,000,000.

PRODUCTION OF URANIUM

Four of the mines in our group have been included in the scheme for the production of uranium and construction of the necessary plants is in progress, financed by loans from American and British Authorities. Production from Luipaards Vlei and Vogelstruisbult is expected to begin about the middle of next year. Erection of the plant at West Driefontein which was postponed in 1952 is to be started, and it will be constructed with sufficient capacity to treat the slimes from Doornfontein, which is also included in the scheme.

In the Orange Free State our Exploration Company continued drilling, particularly in the Saaiplaas area where good results in Boreholes D.S.2 and G.S.1 have materially enhanced the prospects for a mine in this area.

We have directly and through our exploration company a substantial interest in the Harmony mine.

In the platinum industry the Waterval company has obtained great benefit from the programme of expansion undertaken by the Rustenburg and Union mines. This has been completed and production of the platinum group of metals has been substantially increased as a result.

The results have been, on the whole, most satisfactory, particularly in the opening of new mines on the property of West Wits and in the Free State.

Looking to the future, there is no indication at this time of any change in official opinion in the United States regarding an increase in the dollar price of gold. There is, however, a growing body of world opinion that a change is inevitable if normal conditions of international trade are to be re-established.

So far as our own company is concerned we have sound reasons for confidence. Our main interest continues to be in the South African gold mining industry where the expansion which began with the launching of West Witwatersrand Areas 21 years ago is bringing into production mines of considerably higher grade than most of those now being worked. The greater part of our investment is in the newer mines on the Western Rand and in the Orange Free State, and as they come into production the capital we have invested in them becomes increasingly productive.

Another favourable factor is the steady increase in the efficiency of native labour together with some indication that the measures taken to increase the inducements are checking the decline in numbers. The increase in skill and efficiency is particularly important for the future.

The report was adopted.

LONDON AND RHODESIAN MINING AND LAND COMPANY

SIR JOSEPH BALL'S REVIEW

The annual general meeting of the London and Rhodesian Mining and Land Company Limited was held on December 8 in London.

Sir Joseph Ball, K.B.E. (chairman and managing director), presided, and, in the course of his speech said: The profit for the year ended June 30, 1953, amounted to £98,424, and, after providing for United Kingdom and Southern Rhodesian taxation, for an interim dividend of 6 per cent., less tax, which was paid on March 3, 1953, and for the transfer of £20,000 from the Profit and Loss Account to General Reserve, the carry forward at £36,814 is slightly over £2,000 in excess of the corresponding figure last year.

MINING

In 1952, the Company obtained a free development option for three years over an additional 210 base metal claims, upon which asbestos was, at the time, being mined near the surface on a comparatively small but remunerative scale. The combination of the sharp fall in the price of the commodity, and the failure to find at depth any substantial quantities of high-grade asbestos, has made the proposition uneconomic; we are now considering, in conjunction with Coronation Syndicate Ltd. (which Company has accepted a 50 per cent. interest in the proposition) the desirability of abandoning the option. I do not, however, anticipate that any loss which may be incurred by Lonrho in connection with this venture will amount to a substantial figure.

An important source of income to the Company arises from the fees and commissions which we receive as Consulting Engineers and Managers of mines owned by associated companies, such, for example, as the well-known Cam and Motor Mine, and the three mines owned by Coronation Syndicate Ltd., viz. the Muriel mine, Tebekwe mine and the Arcturus mine. During the last year or two they have all made very substantial progress.

NEW ACQUISITION

Shortly after the close of the financial year, we received information as to the possibilities of a gold mining property conveniently situated in the Jumbo district. The property was considered by our mining engineers to be worthy of detailed investigation, and this was accordingly undertaken. Their report was of a sufficiently encouraging nature to convince the Company's Board of Directors that, if the property could be acquired at a reasonable figure, it should be purchased outright. An offer of £80,000 was found to be acceptable, and steps were accordingly taken to form a Southern Rhodesian subsidiary company, with an issued capital of £90,000, to purchase and operate the mine, and the transaction has now been completed.

Mining operations on behalf of the new owners—the Mazoe Consolidated Mines Ltd.—commenced at the beginning of October, with the existing small plant, and resulted in a profit in excess of £400 during the month. It is, however, proposed to install further plant and machinery as soon as possible, with a view to ensuring a much bigger output.

Ranching: The Company owns two ranches in Southern Rhodesia, viz. Wiltshire, comprising 452,582 acres, and Lochard, comprising 187,690 acres. The total profit on our ranching operations during the year under review amounted to £34,596—an increase of approximately £2,100 over the previous year, and this in spite of the fact that last year's profit included some £5,000 arising out of sales which would normally have been made during the year ended June 30, 1951.

REAL ESTATE

The Company still held 973,925 acres of land at June 30, 1953, despite the fact that sales during the year totalled 41,643 acres and resulted in a profit of £22,538. The sales consisted mainly of undeveloped land which had been held by the Company for a good many years, but which did not appear likely to be required for our purposes during any foreseeable period.

During my last visit to Southern Rhodesia, I passed under review the whole of the Company's land holdings, and a decision was taken to sell, at the first opportunity, a number of such properties which were producing little or no revenue. It was in pursuance of this policy that the sales made during the past year were effected, and I hope that further sales may continue during the current year, for it is clearly contrary to public policy that any company should continue to hold land indefinitely, unless some prospect exists for their being able to develop it for productive purposes.

The report was adopted.

LAKE VIEW AND STAR

RECORD TONNAGE MILLED

The 43rd annual general meeting of Lake View and Star Limited, was held on December 15 in London.

Sir Joseph Ball, K.B.E., Chairman of the Company, presided and in the course of his speech said:

The increase in revenue from mining and retreatment operations amounted to £179,978 over the figures for the previous year, and is primarily accounted for by the rise in gold production during the year. Mine working expenditure, including retreatment and development, rose by £196,365, due to further increases in the basic wage and the cost of stores, and to the higher tonnage treated. The amount available for appropriation this year amounts to £465,596 as against £482,151, a decrease of £16,555. To this has been added the sum of £10,000 over-provided for U.K. taxation, mainly as a result of the reduction in the rate of income tax from 9s. 6d. to 9s. in the £. The sum of £272,000, as compared with £304,000 last year, has been appropriated for U.K. taxation, the overall reduction of £32,000 reflecting the smaller profit earned and the reduced amount distributed by way of dividends. Two interim dividends, one of 6d. per share and one of 3d. per share, less tax, were declared in respect of the year, absorbing a net amount of £57,750. After making provision of £28,996 for depreciation of plant and machinery there remains, with the balance of £46,653 brought in from last year, an amount of £163,503, out of which your Directors recommend the payment of a final dividend of 1s. 6d. per share, less tax, making a total distribution for the year of 2s. 3d. per share, as against 2s. 6d. per share for the previous year. The net final dividend will absorb £115,500, and the carry forward will be increased by £1,350 to £48,003.

DEVELOPMENT

Development footage for the year at 27,949 ft. shows an increase over the previous year's figures of 4,717 ft. Of the total development 17,480 ft. was advanced on lodes and 12,698 ft., or 72.7 per cent., proved payable averaging 5.8 dwt. per ton over a width of 60 in., an increase of 2,971 ft. and 6 in. in width. The slight fall in value of 0.2 dwt. per ton is, however, fully compensated by the increased width of ore. Results from the work done have been most satisfactory, as 733,000 tons of new ore have been added to the ore reserves, or just over 11,000 tons more than was milled during the year. Most of the work was in the Western Group of mines, where the high rate of 78 per cent. payability was shown as against 58.6 per cent. in the Eastern Group. It may be of interest to shareholders, as indicating the complex and scattered nature of the lodes which are being developed, to learn that in the Western Group there are twenty named lodes and nine that are known by their co-ordinate positions, whilst at Lake View and Associated Mines in the Eastern Group there are eight named and fourteen known by their position—the total lateral development in the various lodes at the end of the year being approximately 133 miles. Ore reserves at 3,735,300 tons averaging 4.81 dwt. per ton, show an increase of 11,600 tons, and positive and broken ore now accounts for 91.7 per cent. of the total reserves. Shareholders will recall the fact that during each of the preceding two years, the steep rises in costs which occurred rendered necessary the elimination of substantial tonnages of our ore reserves as being unpayable. I am, however, glad to say that during the year under review we have not found it necessary to adopt a similar course.

INCREASED EFFICIENCY

Tonnage of ore milled during the year increased by 69,598 tons to a record figure of 721,845, averaging 4.9 dwt. per ton, a rise of 0.14 dwt. on the previous year.

Turning to the question of costs, you will see that these were 42s. 4d. per ton milled, a rise of 1s. 5d. on the previous year. The fact that the increase was limited to this relatively small amount, despite further rises during the year in the basic wage and in the cost of stores, was due partly to the higher tonnage milled, and partly to continuous and successful efforts to reduce costs and to increase efficiency. On the Associated Area the erection of headframe, bin, feeder and conveyor has been completed, and the electric winder should be completed before the end of this month. The new store which has been erected has been equipped with a 10-ton electric crane, and numerous changes in the plant have been made. A sand pass from surface to the 2,100-ft. level in the Lake View has now been completed. Special grinding equipment has also been installed for sharpening the tungsten carbide tipped steel used in the light machine drills which have done such excellent work during the year. At the Chaffers Retreatment Plant 522,877 tons of old residues were treated averaging 1.12 dwt. per ton at a cost of 3s. 4d. per ton and a profit of £25,464, which includes premium gold sales and copper bullion realization.

Regarding the low extraction figure of 88.12 per cent. reported for the year under review, I received yesterday from our General Manager a letter in which he gives the percentage recoveries for the first five periods of the current year. It is clear from these figures that a considerable improvement in recovery has already been effected. The percentage for the periods ending November 3 and December 1 respectively, being 90.57 per cent. and 91.06 per cent.

The General Manager anticipates a still further improvement in recovery when a third re-grinding unit has been installed.

Additional increases in the basic wage during the year under review, amounting to 15s. 2d. per week, inevitably led to the further rise in working costs previously referred to. The basic wage now payable in Kalgoorlie is £A12 9s. 4d. per week, and there is an additional amount of £A2 per week payable by the gold mining industry in Western Australia, in the form of what is known as "the industry allowance." In September, 1953, the Commonwealth Arbitration Court decided to suspend forthwith the quarterly adjustments of the basic wage as applied to Federal Awards; but the State Arbitration Court of Western Australia is not bound by this decision. This latter Court, however, decided that, while no adjustment would be made in the basic wage rates for the quarter ended September 30, 1953, future changes in the cost of living would be considered by the Court at the end of each subsequent quarter. The decision of the Federal Arbitration Court to suspend quarterly cost of living adjustments to the basic wage has, however, been challenged by the Australian Council of Trade Unions, and the case was due to be heard by the Full High Court of Australia in Sydney on December 1. The result of this appeal has not yet been announced. During the year under review there was a substantial set-off against the increase in costs, in the shape of the premium received from gold sales on the free market, which amounted to £102,212. Receipts from this source have continued into the current year, but during recent months, the price of gold on the free market has fallen steadily to approximately the official price of $35 per oz.; and up to the present date no signs of recovery have appeared.

The report and accounts were adopted.

Company Shorts

Wit. Nigel's Improved Results.—Witwatersrand Nigel during the year ended June 30 last, crushed 202,400 tons, an increase of 66,400 tons over the previous year, due to the bringing into production of the Poortje Section at the end of April, 1952. Gold production showed a big improvement, 45,683 oz. against 32,689 oz. These were the key statistics behind the much improved financial results and, due to the higher tonnage milled, working costs fell from 58s. 7d. (including development costs) to 47s. 8d., as the cost of labour and stores continued to rise.

The profit and loss account reflecting these favourable features showed a net profit of £100,041 which contrasts very pleasantly with £22,258 in the preceding year. The sum of £255,452 was brought in making £360,073 available. General reserve received £270,444 (nil) and after providing £733 (£1,345) to meet the outstanding silicosis liability, and £8 (£67) for taxation, the forward balance was left at £88,888.

Rand Leases (Vogelstruisfontein).—The profit and loss account for the year ended June 30 last showed gold sales at £4,382,627 (£4,783,229) which included premium revenue of £88,446—a considerable drop in revenue from this source compared with the preceding year when £168,438 was received. Working costs were higher, £3,773,759 (£3,660,274), and after providing £50,000 (£395,000) for taxation, the net profit for the year was £542,730 compared with £730,579. Shareholders received less, 13¾ per cent (31¼ per cent) per 10s. share on the £1,800,000 issued capital, this required £247,500 (£562,500) and after all other appropriations the forward balance was £504,267 compared with £484,351. Mr. S. G. Menell is chairman. Meeting, Johannesburg, December 22.

Eastern Transvaal Consolidated Mines.—This company's profit and loss account showed the net profit for the year ended June 30 last at £171,234, compared with £171,031. The dividend was maintained at 7½ per cent, equivalent to 4½d. per 5s. share on the £1,078,543 issued capital. This required £80,891 and after appropriating £132,208 for capital expenditure, the carry forward was reduced to £161,070 compared with £203,715.

Mr. S. G. Menell is chairman. Meeting, Johannesburg, December 22.

THE ANGLO BURMA TIN COMPANY

The 27th Annual General Meeting of the Anglo Burma Tin Company Limited was held on December 16 at the registered office of the company, 208-224 Salisbury House, E.C.2.

Mr. John Miller, Chairman, who presided, in the course of his speech said:

Although the tributing operations which were continued throughout the year resulted in an output of 117 tons of concentrates, compared with 73 tons, the average price of Metallic Tin at which the production was sold was lower at £830 compared with £939 in the previous year. Total proceeds realized were £68,051 compared with £49,755, and with "Interest and Sundry Receipts" £2,300, our total revenue was £70,351, which exceeded operating costs and London expenses by £2,813. However, after providing £11,663 for depreciation and debiting £397 for taxation, there remains a loss for the year of £9,247, from which we have deducted the £8,030 balance of profit brought forward from last year, leaving a debit balance of £1,217 to be carried forward.

MINING OPERATIONS

As you are aware, owing to the disturbed conditions in the Tavoy district no plant operations have been carried on at our Heinda property since March, 1951, and we regret there are still no signs that an early improvement in conditions is likely. Meantime every effort has been, and continues to be, made to maintain tribute production at the highest possible level. The output from the Heinda section for the year under review amounted to 103 tons, compared with 67 tons in the previous year, whilst for the first five months of the current financial year, to the end of October, production has amounted to 61 tons, compared with 52 tons for the corresponding period of the previous year. However, as the more easily worked ground is exhausted it is naturally becoming increasingly difficult by tribute methods to maintain previous results, particularly in view of the lower metal price now ruling.

At our Thabawleik property tributing operations only have been carried on for many years. A small portion of this area, however, is suitable for dredging and some time ago approaches were made to us by Thabawleik Tin Dredging Ltd., whose property adjoins our area and whose dredge was nearing our common boundary. Shortly before the end of our financial year we entered into an agreement with the dredging company to work the property. As consideration, the dredging company paid to us the sum of £4,000. Furthermore, we shall receive an agreed percentage of the value of the ore extracted by them from the area. The advantage to our company of this agreement is, that the ore contained in the small dredgeable area will be extracted within a few months and we shall, therefore, obtain an early benefit from this source, in place of a problematical profit, spread over a period of years, from our small scale tributing.

FINANCIAL POSITION

In the disturbed conditions ruling in Burma the only course open to us is to foster our tribute operations with the object of conserving our liquid resources. I am pleased to point out, therefore, that before charging depreciation the past year's operations showed a small working profit and, with the additional receipts of a capital nature which accrued during the year, the liquid position was again improved. Current assets at May 31 last exceeded current liabilities, future taxation reserve and debenture indebtedness by £58,295, compared with £31,664 at the end of the previous year.

BURMA GOVERNMENT

As mentioned in our Report the Burma Government called a meeting of the representatives of the tin mining companies of Lower Burma in August last, at which it was proposed to the companies that they should enter into a joint venture with the Government.

Views on this proposal were called for and we expressed our willingness to consider such a scheme on reasonable terms.

The Burma Government also requested companies to supply information regarding their leases and mining operations which we have submitted.

We have no further developments to report and the matter now rests with the Government.

STAFF

I would like again to express our thanks to our small staff for their loyal services during the year, which has again been an extremely difficult one.

The report and accounts were adopted.

HARRISONS & CROSFIELD LIMITED

A SATISFACTORY YEAR

The forty-fifth annual general meeting of Harrisons and Crosfield, Ltd., was held on December 14 in London.

Sir Eric Miller (chairman) was able to report another satisfactory year's results. No live trading business like theirs could escape the impact of world trends, but they could mitigate their effect on their own fortunes by foresight and perpetual vigilance. It was an advantage that they had a multiplicity of interests—like the showman with his swings and roundabouts—and that they combined at Head Office and overseas, a diversity of talent, all rendering loyal and useful service under the H. and C. banner. The net profit of £667,672, after tax, was only £13,000 less than the record figure for 1952. The final dividend recommended on the Deferred Ordinary Stock was 27½ per cent, making 35 per cent for the year, compared with 30 per cent. The excess of current assets over current liabilities at June 30, 1953, was £4,725,000, marking the strength and liquidity of their financial condition.

In a comprehensive review of the company's activities he spoke of the substantial contribution made to the sterling area's dollar resources, not only through shipments of tea, rubber and other Eastern produce, but also through the trading activities of associated and subsidiary companies in the New World.

In association with Hambros Bank they had formed a new Canadian Corporation, named "Locana Corporation Ltd." The other shareholders were financial institutions which afforded Locana access to funds far in excess of its own capital.

The main object was to assist British manufacturers and contractors wishing to enter the Canadian market to obtain advice, finance, management and sales facilities, according to their proven needs, to enable them to secure a sound foothold for their goods or technical skill in that great Dominion whose natural resources offered such abundant scope for gradual development.

TEA

Tea was still a relatively very cheap beverage; although the average overall cost of production was roughly three times as great as it was before the war, the retail price of the popular blends in this country was only slightly more than double, i.e. the 2s. 4d. packet of 1939 was priced at between 4s. 8d. and 5s. to-day.

Before the war stocks of tea in United Kingdom warehouses at times had run up to 200,000,000 lb., but at present they were less than half that figure. An average stock of less than 100,000,000 lb. was not sufficient to guard against unforeseen factors which might bring about temporary but disturbing price movements.

RUBBER

Referring to rubber, the chairman said that when they had met a year ago the spot price of No. 1 T.R.S.S. in London was 26½d. per lb from which figure, with minor fluctuations, there was a persistent decline until a low point of 16d. was registered in the latter part of October, since when there had been a slight recovery. There was no need for him to emphasize the serious effect of the loss of revenue on the economy of S.E. Asia and on rubber producers in particular.

Unduly depressed prices were slowly reducing production, particularly on the smallholdings. Simultaneously, the lower price and the greater freedom of usage were having their effect on the relative proportions of natural and synthetic being used by American manufacturers. The swing-over from one to the other did not happen overnight, but once a change had been made it was likely to be of some duration until the differential of cost moved too far the other way.

For himself he attributed most of their 1953 troubles to the reactivation of the alcohol plants at the end of 1952, the high cost output of which was sold at the price of petroleum G.R.-S. at the rate of about 10,000 tons a month till they were closed down again in August. The offtake of concentrated natural latex was growing apace in all consuming countries and the merits of foam rubber upholstery were so outstanding that he looked for further steady expansion in its use.

The graph of world consumption of rubber over the years showed that minor fluctuations were speedily ironed out and that there was no stopping the progressive steady rise in the use of that versatile material. They had been interested in the production of natural rubber for 50 years and their faith in it was undimmed by any claims made for general-purpose synthetics.

The report was approved, and, at subsequent meetings, proposals for a capitalization of reserves and a bonus issue to Deferred Ordinary stockholders were adopted.

SIR LINDSAY PARKINSON & CO.

IMPROVED POSITION

The 16th annual general meeting of Sir Lindsay Parkinson and Co. Ltd. was held on December 11 in London, **Mr. A. E. Parkinson,** chairman, presiding.

The following is an extract from his circulated statement:

The Accounts show that for the year 1952, the Group profit applicable to Members of the Parent Company amounted to £66,837, compared with a loss for 1951 of £46,490. This profit for 1952 was after bringing to credit a sum of £181,593 not relating to the actual year's trading. The comparative item in 1951 was £76,515.

Almost the whole of the £181,593 credit was accounted for by an adjustment of Plant Depreciation charges over-provided in respect of one Subsidiary Company, where the Plant in question has subsequently been sold. This is an adjustment which we regard as not strictly relating to the particular year's trading, but is, nevertheless, the type of adjustment which does recur from year to year. The Group Profit and Loss Balances carried forward amount to £46,779, compared with £8,454 brought in.

As I indicated to you last year, your Board has been grappling with the problem of greatly increased costs on several large pre-devaluation Opencast Coal contracts. I am pleased to say that the adverse effect of these particular contracts upon the Company's annual trading results is now rapidly diminishing.

The Consolidated Balance Sheet of the Group shows a surplus of current assets over current liabilities and provisions amounting to £237,407, compared with £127,387 last year. The corresponding surplus of the Parent Company is £247,078, compared with £170,288 last year.

Your Board recommends that the total distribution for 1952 should be at the same level as for 1951, viz. a total of 8 per cent. on the Cumulative and Participating Preferred Ordinary Stock and 10½ per cent. on the Ordinary Stock.

FOREIGN CONTRACTS

Cyprus: Excellent progress has been made on the War Office Contract for the First Phase of the W.D. Cantonment at Dekhelia. Work to the value of over £750,000 has been carried out in 1953.

Australia: The position I outlined to you last year with regard to the Opencast Coal Contract was followed by the cancellation of the Contract early this year. Our Australian Subsidiary Company had a firm contract for a specified tonnage, and a settlement was negotiated which adequately compensated our subsidiary for its loss of earnings, and for its loss upon nugatory preliminary expenditure. The Building and Civil Engineering subsidiary continues to secure a considerable volume of work.

Canada: Your Board has, during 1953, acquired a controlling shareholding in a well-established Building and Contracting business in Montreal. Arrangements have been made for a continuity of the present management conjointly with technical assistance from the Parent Company. It is hoped that with the anticipated expansion of this business, your company would, in due course, derive a satisfactory return.

At the same time, a Subsidiary Company has been registered in Toronto, and has recently commenced operations. The present growth in the economic life of Canada has led your Board to embark on this new venture, with a view to participating in the many Civil Engineering projects which are opening up in the rapidly expanding Dominion.

English Subsidiary Companies: Further to my comments last year regarding Wentworth Estates, Ltd., I am able to tell you that we are now profitably carrying out housing development on this Estate, and the coming year should see a further increase in the number of houses under construction for sale to private owners.

Work on hand, within the Group, is of considerable magnitude, although the volume of Opencast Coal work has declined. It is still my opinion that the Civil Engineering Industry could produce for the country 15,000,000 tons of Opencast Coal per annum, provided that the National Coal Board would expedite the prospecting of new sites, and provided that unreasonable opposition from the many interested Departments did not limit the utilization of these sites for Opencast purposes.

There is, at present, quite a large amount of Contractors' excavating plant out of work which could be utilized to increase the output. Nobody can deny that the need for coal is still as vital as ever. We have, of course, a substantial amount of Building and Civil Engineering constructional work under way for various Government Departments and Local Authorities.

The report was adopted.

THE CENTRAL MINING-RAND MINES GROUP

DECLARATION OF DIVIDENDS

NOTICE IS HEREBY GIVEN that DIVIDENDS have been declared payable to shareholders registered in the books of the undermentioned Companies at the close of business on December 31, 1953, and to persons presenting the respective Coupons detached from Share Warrants. Dividends on shares included in Share Warrants will be paid in terms of a notice to be published later by the London Secretaries of the Companies.

The dividends are declared in South African currency and become due on January 2, 1954. Payment from the Office of the London Secretaries will be in British currency at par provided that should there be any difference that may be regarded by the Boards as material between the two currencies on January 2, 1954, payment will be made on the basis of the equivalent British currency calculated at the rate of exchange ruling on that date.

Warrants in payment will be posted on or about February 8, 1954, to shareholders at their registered addresses or in accordance with their written instructions. Warrants will be despatched from the Registered Office, Johannesburg, to addresses in Africa south of the Equator and from the Office of the London Secretaries to addresses elsewhere. Instructions which will necessitate an alteration in the Office from which payment is to be made must be accepted by the Companies on or before December 31, 1953. Other changes of dividend instructions to apply to these dividends must be received by the Companies not later than January 29, 1954.

The Transfer Books and Registers of Members will be closed in each case from January 1 to 7, 1954, both days inclusive.

Name of Company (Each incorporated in the Union of South Africa)	Dividend No.	Coupon No.	Dividend Per Share s.	d.
Rand Mines, Limited	101	101	3	0
Blyvooruitzicht Gold Mining Company, Limited	16	—	1	4
City Deep, Limited	68	68		6
Consolidated Main Reef Mines and Estate, Limited ..	88	85	1	9
Crown Mines, Limited ..	105	105	3	0
Durban Roodepoort Deep, Limited	66	66	1	9
East Rand Proprietary Mines, Limited	68	69	1	9
Modderfontein East, Limited..	53	34	1	6
Transvaal Consolidated Land and Exploration Company, Limited	31	31	1	9
Transvaal Gold Mining Estates, Limited	86	86		9

A. MOIR & CO.
London Secretaries of the above-named Companies.

Office of the London Secretaries:
4 London Wall Buildings, London, E.C.2.

December 10, 1953.

Mining Men and Matters

Mr. L. H. Cooper, chairman of the Mond Nickel Company, has been elected a vice-president of the International Nickel Company of Canada and will assume his new office on January 1 next.

Sir E. M. F. Fergusson has joined the board of Petaling Tin in succession to **Mr. H. H. Facer** whose resignation (owing to retirement from Malaya) took effect on October 31, 1953.

Sir Norman Mighell has resigned from the board of Western Mining Corporation.

Lord William Percy is resigning his directorship of the St. John d'el Rey Mining Company as from December 31 next, and Mr. Richard Fort, M.P., has been elected in his place.

Mr. A. R. O. Williams has been appointed a director of Lake View and Star.

F. E. Weatherill Ltd. have announced that they have been appointed main distributors for the Epping Auto-Shunter for Great Britain and all territories overseas.

ANGLO AMERICAN CORPORATION GROUP OF COLLIERIES

DECLARATION OF COLLIERY DIVIDENDS

NOTICE IS HEREBY GIVEN that Dividends have been declared payable to shareholders/stockholders registered in the books of the undermentioned Companies at the close of business on December 31, 1953.

The Dividends are declared in the currency of the Union of South Africa and become due on January 2, 1954. Dividend warrants will be posted from the Head and London Offices on or about February 15, 1954.

The dividends are payable subject to the usual conditions which can be inspected at the Head and London Offices of the Companies.

The Transfer Books and Registers of Members will be closed in each case from January 1, 1954, to January 9, 1954, both days inclusive.

The effective rate of Non-Resident Shareholders' Tax for the Dividends is 7.5 per cent.

NAME OF COMPANY (Each of which is incorporated in the Union of South Africa)	DIVIDEND NO.	RATE OF DIVIDEND
Amalgamated Collieries of South Africa Ltd.	35	2s. 3d. per share
South African Coal Estates (Witbank) Ltd.	62	1s. 9d. per share
Springbok Colliery Ltd.	13	1s. per unit of stock

The estimated net profit of Amalgamated Collieries of South Africa Limited for the year ending December 31, 1953, is £690,000 before providing for taxation. This figure is provisional and subject to the final audit in due course. The profit for the year 1952 was £693,453.

BY ORDER OF THE BOARDS,
ANGLO AMERICAN CORPORATION OF SOUTH AFRICA LIMITED.

W. E. GROVES,
London Secretary.

London Offices:
11 Old Jewry, E.C.2.
December 16, 1953.

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CAPITAL SUBSCRIBED - - - £12,000,000
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DIVIDENDS

Amalgamated Collieries of South Africa 11¼% (February 16)
Apex Mines 30% (January 3)
Apex (Trinidad) Oilfields 40% (January 30)
Associated Manganese Mines of South Africa 80%
Ayer Hitam Tin 10% (January 13)
Bechuanaland Exploration 7½%
British Insulated Callender's Cables 2½% *i* (January 18)
Bulolo Gold Dredging 50 c. *i*
Cam and Motor Gold 20% (January 14)
Central Mining and Investment 3¼ % *i* (December 22)
Consolidated African Selection Trust 60%
Consolidated Diamond Mines of S.W. Africa 100%
Cons. Murchison (Transvaal) Goldfields 40%
Consolidated Zinc Corporation 5% *i* (January 1)
Coronation Syndicate 15%
Frontino Gold Mines Pref. 1s.; Ord. 6d. (January 1)
Gold Coast Selection Trust 15% *i*
Harrisons and Crosfield Cum. Pref. 6%; Pref. Ord. 10% (December 31)
Jos Tin Area (Nigeria) 20%
Johnson Matthey and Co. 3% *i*
Kern Oil 22½% (January 1)
Kinta Tin Mines 7½% *i* (December 23)
Metal Box 5% *i* (January 1)
Mt. Isa Mines 10%
Mt. Lyell Mining and Railway 6¼%
Nchanga Consolidated Copper 25% *i*
New Broken Hill Consolidated 15% *i* (January 1)
Nigerian Consolidated Mines 5% *i*
Noranda Mines $1 *i*
Pahang Consolidated 30% (December 19)
Rand Selection Corporation 2s. (January 5)
Rhodesia Broken Hill Development 7½% *i* (February 11)
Ribon Valley (Nigeria) Tinfields 5%
Siberian Syndicate 10%
South American Gold and Platinum 10 c.
South African Coal Estates (Witbank) 8¼% *i* (February 16)
South African Manganese 25% *i*
South African Townships 2½% (January 5)
South West Africa Company 11¼%
Tanjong Tin Dredging 7½% *i* (December 23)
Trinidad Central Oilfields 7½% *i*

i interim

OUT OF YOUR GROUND

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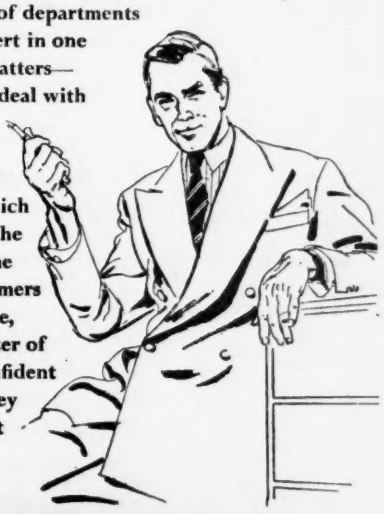

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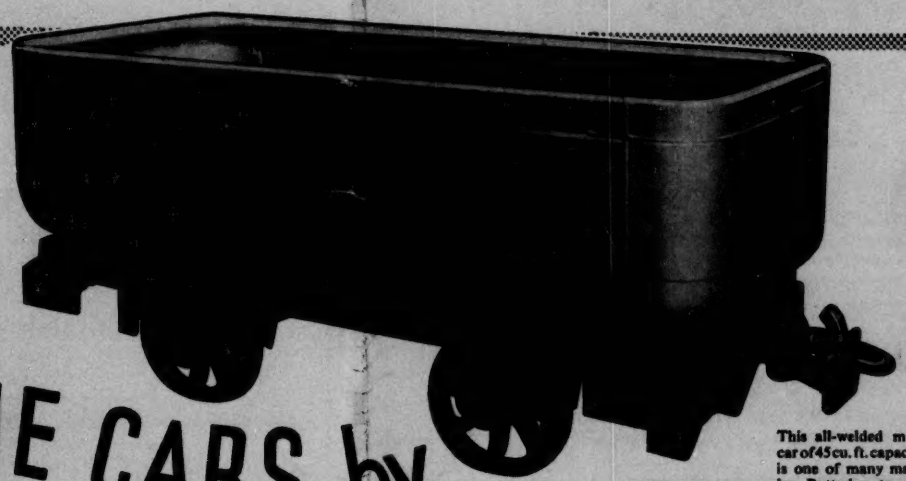

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